Deciphering Neanderthal DNA | The Quilters of Gee's Bend

Smithsonian

{ OCTOBER 2006 }

The Search for New Planets

(Too bad about Pluto, but the real action is beyond our solar system)

Why are Iraq's Marsh Arabs Stuck in Political Quicksand?

Batsman Up! Cricket Demystified

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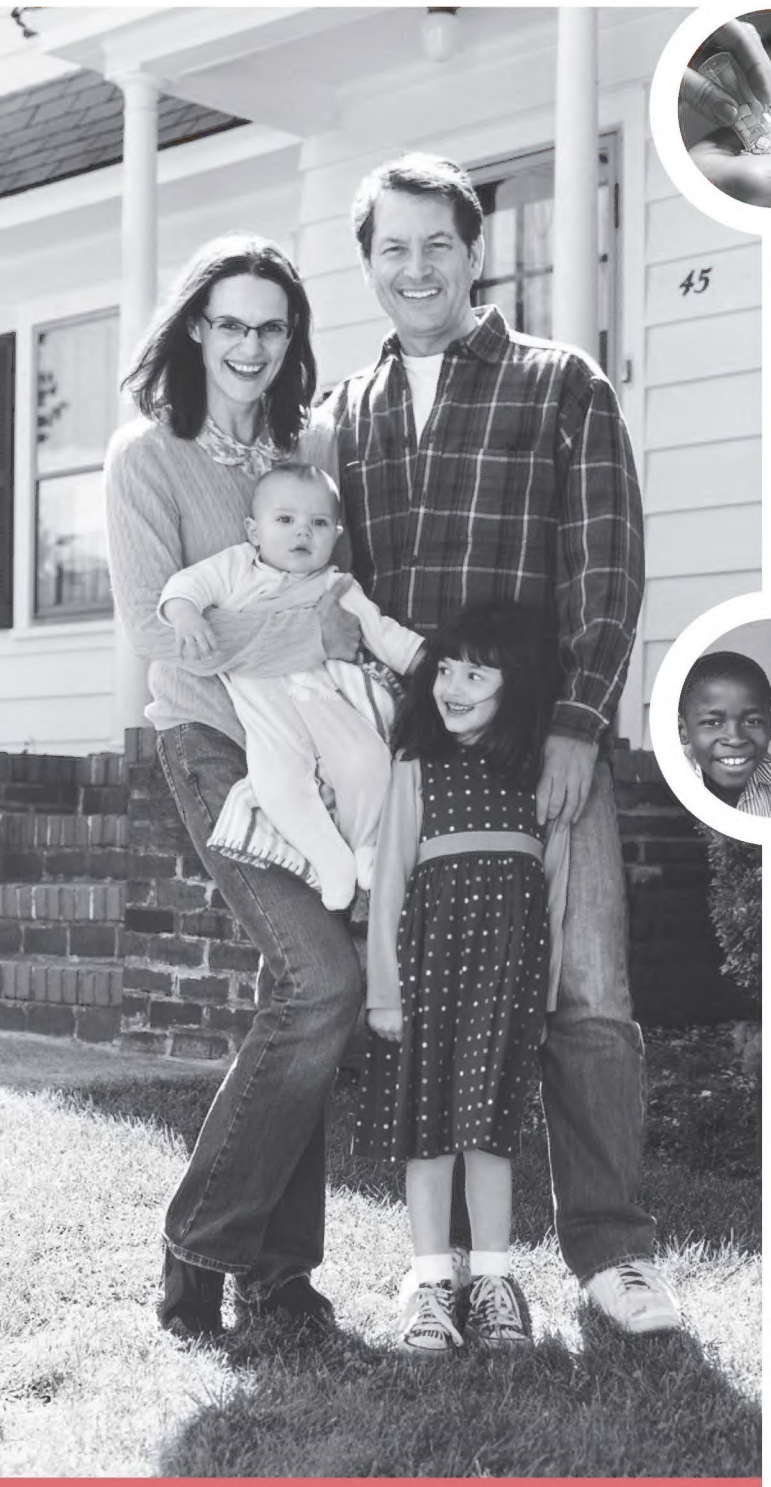

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Smithsonian features

{ OCTOBER 2006 · VOLUME 37, NUMBER 7 }

Today, many Americans dismiss cricket as an elitist game played by girlie-men. That may be because the game is superficially slow. Or because the players still tend to dress in traditional white and break for tea. —"CRICKET, ANYONE?" PAGE 56

38 The Planet Hunters

Searching other stars in the Milky Way, a team of astronomers based in California hopes—and fully expects—to find new worlds like our own

BY ROBERT IRION / PHOTOGRAPHS BY PETER MENZEL

46 Return to the Marsh

A vengeful Saddam Hussein destroyed wetlands in southern Iraq that had sustained people for millennia. Is the effort to restore the ecosystem bogging down?

BY JOSHUA HAMMER
PHOTOGRAPHS BY PETER VAN AGTMAEL

56 Cricket, Anyone?

Thanks to an influx of sports-minded immigrants from South Asia and the Caribbean, our former national pastime is winning back fans in this country

BY SIMON WORRALL / PHOTOGRAPHS BY GREG FOSTER

66 Fabric of Their Lives

Two exhibitions of astonishing quilts made in Gee's Bend, Alabama, have changed how we think about art—and transformed the artists themselves

BY AMEI WALLACH / PORTRAITS BY JOHN F. FICARA

76 Neanderthal Man

Svante Paabo made his name by deciphering DNA from a 2,400-year-old Egyptian mummy. Now he's mapping the genome of our 45,000-year-old cousin

BY STEVE OLSON

84 Say What?

It turns out that language experts may be wrong *aboot* the demise of regional American accents

BY ULRICH BOSER / ILLUSTRATION BY ERIC HANSON

86 The Painter Who Hated Picasso

Though his splendid equestrian paintings owe much to Impressionism, Sir Alfred Munnings had no use for most modern art—as he would be the first to tell you

BY PETER CHEW

THIS PAGE: Cricket has no time limit. Some matches (North Atlanta players celebrate during a playoff with Atlanta's Tropical Sports Team) have gone on, and on, for days. Photograph by Greg Foster.

COVER: Astronomers have found about 200 planets (star cluster NGC 346) outside our solar system. Photograph by NASA, ESA and A. Nota (STScI / ESA).

Smithsonian departments

{ OCTOBER 2006 · VOLUME 37, NUMBER 7 }

When I returned to the marshes in May 2006, southern Iraq had become a far more dangerous place. Killings of Westerners had made travel highly risky.

—**"RETURN TO THE MARSH,"** PAGE 46

14 INDELIBLE IMAGES
WHEN HE SAID "JUMP . . . "

Life photographer Philippe Halsman spontaneously elevated portraiture to imposing heights
BY OWEN EDWARDS

18 MY KIND OF TOWN
A DOG NAMED WILEY

A Montana writer finds his place in the pack when a winsome stray disrupts his orderly life
BY DAVID QUAMMEN

96 PRESENCE OF MIND
300 MILLION

This month, the United States reaches a major population milestone, raising the question: Who *are* all these Americans?
BY JOEL GARREAU

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PATENT MODEL
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MOONSTRUCK

THIS PAGE: A Marsh Arab woman near Basra, Iraq. Photograph by John D. McHugh / AFP / Getty Images.

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Americans spend over one million dollars on energy every minute.

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Incorporating energy efficient technology into new construction could reduce consumption by 40%. Governments and businesses must reduce their own energy use and promote conservation to their citizens and employees. Further improvements in fuel efficiency will play a crucial role, too. And the average person wields incredible power when it comes to conserving energy, from driving slower to switching to more efficient home appliances.

Of course, not only does using less energy mean there's more fuel to go around, it also means fewer greenhouse gas emissions. The fact is, if everyone began conserving today, we'd see results immediately. We've taken some of the steps needed to get started but we need your help to get the rest of the way.

Conservation Facts:

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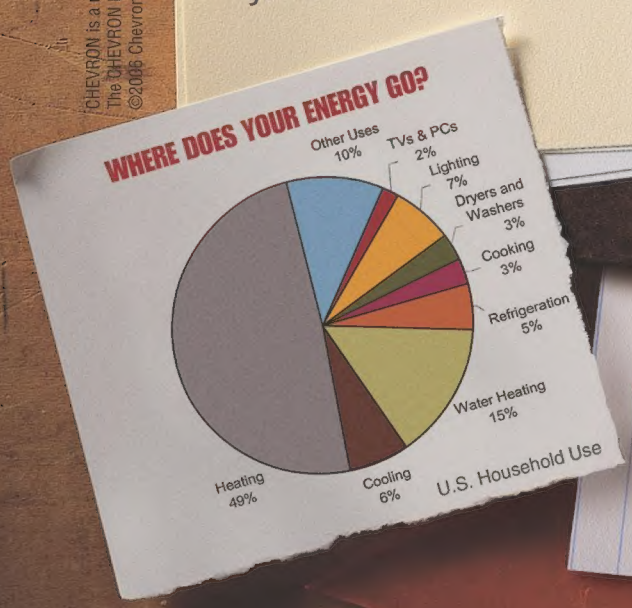

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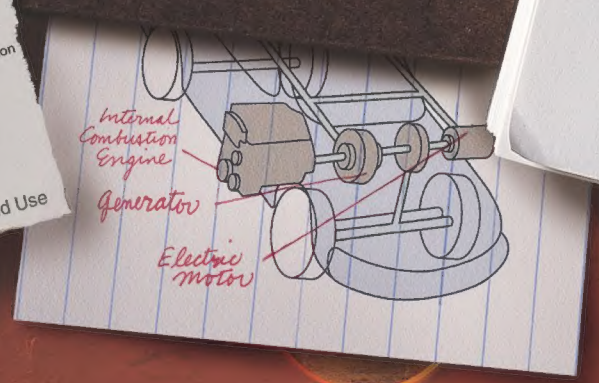

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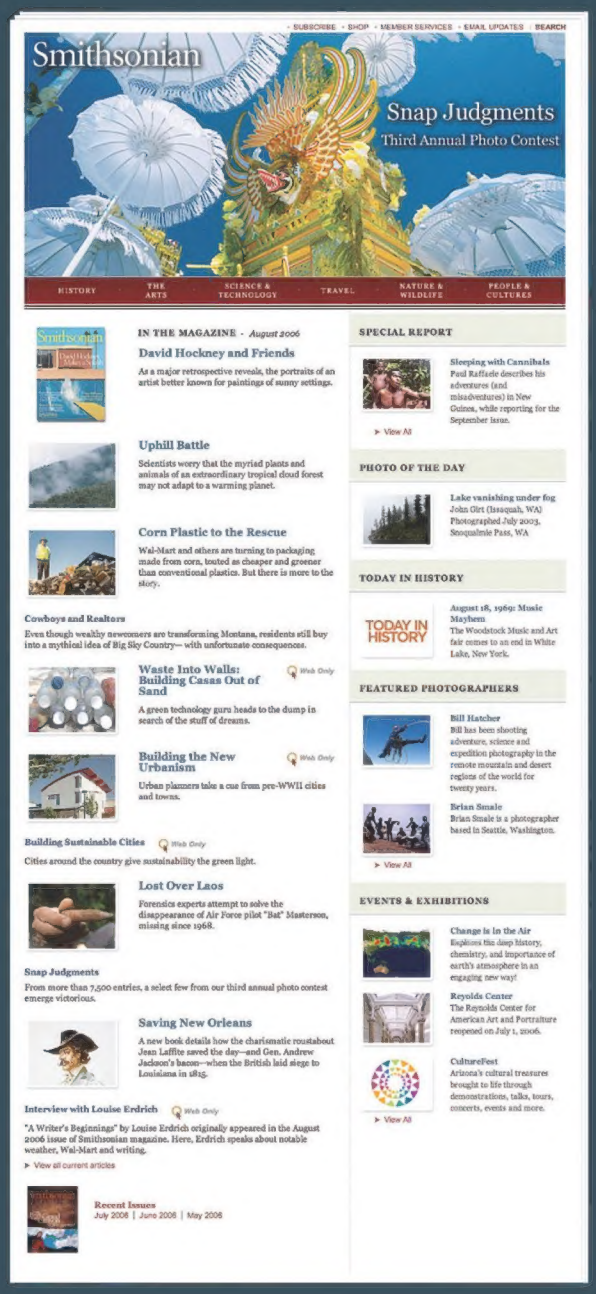

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FROM THE EDITOR

Celestial Navigations

Searching the heavens for new worlds far away

BY CAREY WINFREY

GROWING UP IN NORTHERN VERMONT, Robert Irion loved visiting New York City and stepping on the scales at the old Hayden Planetarium to see how much he would weigh on Jupiter and Mars. Inspired by "Cosmos," Carl Sagan's public television series, he majored in astronomy at MIT. Later, as a public information officer at the University of California at Santa Cruz, and then as a correspondent for *Science* magazine, Irion got to know some of the dedicated astronomers who search for planets in other solar systems in our galaxy. "It's been fantastic to see the number of planets outside our solar system go from zero a little more than a decade ago to 200 today," he says. "It's a remarkable feat, so describing it for a general audience was a great challenge." His story, "The Planet Hunters," begins on page 38.

Irion: "Orion (one letter different from my last name) is still my favorite place to stare."

Irion is sometimes asked why it's important to know about planets so impossibly far away. "For the first time," he answers, "we can anticipate learning that other worlds with properties similar to ours exist. Whether life also exists on those bodies is a much more difficult question—and one that may take decades to answer. But simply finding them will show us whether our own cozy system of planets—with or without Pluto—is common or a fluke."

PETER CHEW, who died this past July 16 at age 82, was a longtime friend of SMITHSONIAN whose byline appeared in the magazine six times. "Five of the articles," he recalled, were "about horses and one about mules." In fact, Chew's mule epic was the cover story for the November 1983 issue, and Don Moser, then SMITHSONIAN's editor, selected it for his book *Editor's Choice*. Chew also worked at SMITHSONIAN during the magazine's first summer (1970) while on vacation from *The National Observer*. "It was great fun—the only place I've ever worked where the editor [Ed Thompson] came around with cold beer when it was necessary to work late." Ah, those were the days.

A Princeton graduate, Chew drove an American Field Service ambulance with British forces in the Middle East and Italy in World War II. After leaving the *Observer* in the mid-1970s, he covered Thoroughbred racing for *The Blood-Horse* magazine. He is the author of *The Kentucky Derby: The First Hundred Years* and *The Inner World of the Middle-Aged Man*.

His seventh, and, alas, last article for SMITHSONIAN, "The Painter Who Hated Picasso" (pg. 86), brings cantankerous sporting artist Alfred Munnings vividly to life.

R. R. JONES

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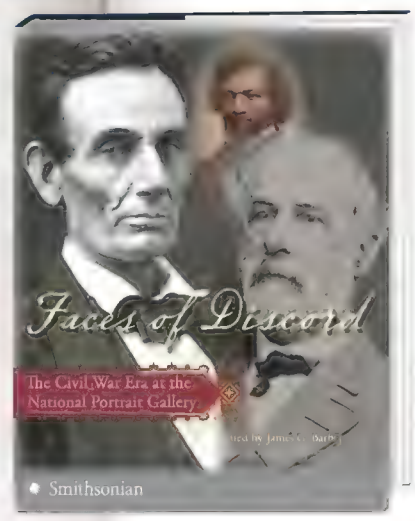

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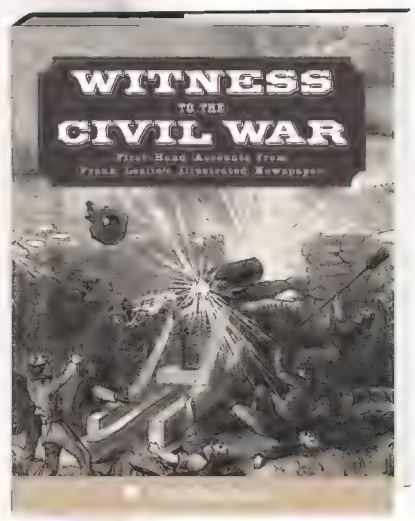

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LETTERS READERS RESPOND TO THE **AUGUST** ISSUE

As a relative of an airman missing in action in North Korea since the Korean War, I read "Lost Over Laos" with great emotion. It details the scenario thousands of families of missing soldiers hope to experience. To have the fate of loved ones known with certainty, to bring them home at last to the country they served, is our ultimate wish.

MYRA K. HILLBURG, FAIRFAX, VIRGINIA

HOMECOMING WISH

THE JOINT POW/MIA Accounting Command has a budget of $50 million to recover remains from all over the world. Meanwhile, those wounded in Iraq and Afghanistan are facing Veterans Affairs budget cuts that might affect their treatment and rehabilitation. Is it fair or reasonable to spend millions on dead people while wounded people are being ill cared for?

DAVID STEINER, LT. COL. USAF (RET)
ALLENSPARK, COLORADO

YOUR ARTICLE about searching for the remains of pilot "Bat" Masterson was especially poignant for me, a USAF Vietnam-era vet (1973-75). When I purchased a POW/MIA bracelet, I asked for one that represented a member of the USAF. The stainless-steel bracelet I received and still wear with pride reads: "Lt. Col. Michael "Bat" Masterson, USAF, 10.13.68 Laos."

R. ALLEN PICKETT
PHOENIX, ARIZONA

SKEPTICAL IN MONTANA

MONTANANS ("Cowboys and Realtors") get a big chuckle out of guys who live in places like Seattle thinking they have us all figured out, and who write about how we're so gullible and ignorant that we're hoodwinked into electing anyone for public office who totes a gun and sits on a horse long enough to have his picture taken. We have few illusions about our state. We see the beauty of this open, wild country every time we look around, and we see the

glut of new and expensive housing developments. We see the housing market being driven beyond our reach by "newcomers," as the author of the article, Blaine Harden, calls them, with their "trophy ranches" and 5,000-square-foot homes. But for Harden to leap to the suggestion that disgruntled, resentful Montanans are venting their frustrations by killing 11 grizzlies a year is foolish, especially as Harden himself says there is no evidence as to who is doing the killing.

K. MERRICK
HELENA, MONTANA

"COWBOYS AND REALTORS" states that Cole Porter wrote the hit song "Don't Fence Me In." But it was Bob Fletcher of Butte, Montana, who wrote the lyrics. He sold his poem to Porter in 1934, and Porter composed the music for it (and he owns the copyright). Fletcher, who died in 1972, was also the father of the historical marker signs adorning highways in Montana.

JACK DARLOW
STEVENSVILLE, MONTANA

PACKAGE DEAL

CORN PLASTIC—the future of plastic in a post-petroleum world? ("Corn Plastic to the Rescue?") Whoa! As an article in the July issue ("What's Eating America") points out, growing corn requires prodigious amounts of nitrogen fertilizer, which requires prodigious amounts of fossil fuel. The production of corn plastic may not consume as much petroleum as conventional plastic packaging, but let's not delude ourselves. If you want to reduce our dependence on fossil fuels and the size of our landfills, buy food with minimal or no packaging, like an ear of corn—and leave the produce department's little plastic bags on the roll.

TERRIE BLEVINS
THOMASVILLE, NORTH CAROLINA

A SUPERFLUOUS BATTLE?

ONE MIGHT WONDER how history ("Saving New Orleans") would have played out if communications in the War of 1812 had been as instant as they are today. To wit, the "supposed" decisive Battle of New Orleans was fought two weeks after the Treaty of Ghent, which officially ended the war, was signed (though not ratified). Slow news for those that were to die in battle, but good timing for the historic reputations of Andrew Jackson and Jean Laffite.

SAM OSBORNE
WEST BRANCH, IOWA

CORRECTIONS:

The first athlete to win four gold medals at a single Olympics was not Jesse Owens ("This Month in History") but Alvin Kraenzlein, an American track-and-field star at the 1900 Olympic Games in Paris.

In "Wild Things," a caption for an artist's rendering of an extinct ancestor of whales and dolphins misstated the species. It is a Rodhocetus.

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WILD THINGS

LIFE AS WE KNOW IT

TAKING THE LOW ROAD

Where do elephants roam? Tracking 54 African elephants equipped with GPS-transmitter collars in northern Kenya, scientists working with the Save the Elephants foundation clearly documented that the animals avoided hills. Why? The scientists calculate that it takes an elephant 25 times more energy to gain, say, 100 feet in altitude than it does to walk 100 feet along a flatland. And since an adult elephant already spends 18 hours a day foraging to fuel a typically 9,000-pound body, mountaineering isn't worth the effort, even if there's food uphill. The new findings may help conservationists secure elephant habitats.

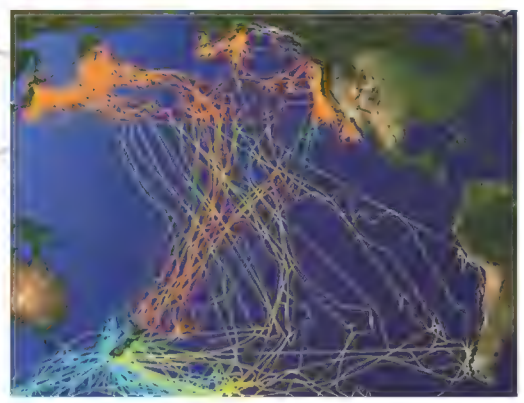
FLIGHT OF THE BUMBLEBEE

When biologists presented bumblebees with a mixture of artificial blooms—some heated and marked with purple, others slightly cooler and pink—most of the bees returned to the purple ones. The study, from the University of Cambridge and the University of London, is the first to show both that bees prefer warmth and that they learn quickly where to find it. As the researchers point out, a bee (at right, in an infrared image) can't fly unless its body temperature is at least 86 degrees; landing on a warm flower would help it retain body heat.

CONTAGIOUS

Researchers at University College London have discovered a unique contagious cancer. The genital tumor, found only in dogs, is not caused by an infectious agent (as some human cancers are) but by the transmission of cancerous cells during sex. The disease, which afflicts dogs worldwide, is rarely lethal. The scientists speculate that the cancer originated in a husky or Shih Tzu from East Asia or Siberia 250 to 2,500 years ago.

ENDLESS SUMMER A small seabird has logged the longest annual migration ever recorded. Scientists from the University of California at Santa Cruz attached monitors to 19 sooty shearwaters and found they covered some 39,000 miles over 262 days, tracing "figure eights" across the Pacific (blue, breeding grounds; yellow, northward migration; orange, wintering grounds). Arctic terns fly similarly long routes, but it's not known if they do so within a year.



Observed

NAME: Praying mantis

PRAYING FOR WHAT? Probably protection, among the males. The females occasionally bite the males' heads off during mating.

TALK ABOUT HIGH-RISK SEX: The question has been whether males resist this cannibalism or submit to it, essentially surrendering their lives for the privilege of passing on their genes. **AND?** The males are love struck but not suicidal, suggests a new study by researchers at the State University of New York at Fredonia. Males approach hungry females (as opposed to well-fed females) more cautiously, court more assiduously and mount from a greater distance. Post-coitus, a male will cling to a hungry female about three times longer—perhaps waiting to seize the moment for a safe dismount.

CLOCKWISE FROM TOP RIGHT: TIM DAVIS / CORBIS; CORBIS; BRIAN PATTESON / VIREO; PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES (AUG. 22, 2006); SUSIE NEEL; B. BUJOK, M. KLEINHENZ & J. TAUB / BEEGROUP WÜRZBURG

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When He Said "Jump . . ."

Philippe Halsman defied gravitas

BY OWEN EDWARDS

THE FREEZING OF MOTION has a long and fascinating history in photography, whether of sports, fashion or war. But rarely has stop-action been used in the unlikely, whimsical and often mischievous ways that Philippe Halsman employed it.

Halsman, born 100 years ago last May, in Latvia, arrived in the United States via Paris in 1940; he became one of America's premier portraitists in a time when magazines were as important as movies among visual media.

Halsman's pictures of politicians, celebrities, scientists and other luminaries appeared on the cover of *Life* magazine a record 101 times, and he made hundreds of other covers and photo essays for such magazines as *Look*, *Paris Match* and *Stern*. Because of his vision and vigor, our collective visual memory includes iconic images of Albert Einstein, Marilyn Monroe, Robert Oppenheimer, Winston Churchill and other newsmakers of the 20th century.

And because of Halsman's sense of play, we have the jump pictures—portraits of the well known, well launched.

This odd idiom was born in 1952, Halsman said, after an arduous session photographing the Ford automobile family to celebrate the company's 50th anniversary. As he relaxed with a drink offered by Mrs. Edsel Ford, the photographer was shocked to hear himself asking one of the grandest of Grosse Pointe's grande dames if she would jump for his camera. "With my high heels?" she asked. But she gave it a try, unshod—after which her daughter-in-law, Mrs. Henry Ford II, wanted to jump too.

For the next six years, Halsman ended his portrait sessions by asking sitters to jump. It is a tribute to his powers of persuasion that Richard Nixon, the Duke and Duchess of Windsor, Judge Learned Hand (in his mid-80s at the time) and other figures not known for spontaneity could be talked into rising to the challenge of . . . well, rising to the challenge. He called the resulting pictures his hobby, and in *Philippe Halsman's Jump Book*, a collection published in 1959, he claimed in the mock-academic text that they were studies in "jumpology."

Portraiture is one of the greatest challenges in photography, because the human face is elusive and often mask-like, with practiced expressions for the standard range of emotions. Some photographers accept these preset expressions—think of annual-report portraits of corporate officers—and others try to eliminate expression altogether, to get a picture as neutral as a wanted poster. Halsman was determined to show his sitters with their masks off but their true selves in place.

I had the good luck to spend time with Halsman in 1979, not long before he died, when I was writing the catalog for an exhibition of his work. I remember his way of delivering a funny line with perfect timing and a deadpan expression Jack Benny might have envied—and his delight at seeing how long it took for others to realize he was joking. For someone who spent his work-

Dean Martin and Jerry Lewis went airborne (opposite) in 1951 for a story Halsman was shooting about TV comics. Soon, the photographer (left, with Marilyn Monroe in 1959) was asking all his subjects to jump as a way to loosen up.

YVONNE HALSMAN; P. 15 PHILIPPE HALSMAN ESTATE

"He started to look at his jump pictures as a kind of Rorschach test, for the sitters and for himself."

"With my high heels?" asked Mrs. Edsel Ford when Halsman requested that she levitate. But he was flexible about footwear, as leaps by Ford (left), the Duke and Duchess of Windsor (center) and future president Richard M. Nixon suggest. "Halsman came to the idea of jumping naturally," says a former colleague. "He would surprise people at the beach by doing impromptu back flips."

ing hours with some Very Important People, this subversive streak must have been hard to contain. Sean Callahan, a former picture editor at *Life* who worked with Halsman on his last covers, thinks of the jump photos as a way for the photographer to unleash his sense of mischief after hours of work.

"Some of Halsman's sitters were more skillful at hiding their true selves than he was at cracking their facades, so he started to look at his jump pictures as a kind of Rorschach test, for the sitters and for himself," says Callahan, who now teaches the history of photography at the Parsons School of Design and Syracuse University, both in New York. "Also, I think Halsman came to the idea of jumping naturally. He was quite athletic himself, and well into his 40s he would surprise people at the beach by doing impromptu back flips."

The idea of jumping must have been planted in Halsman's mind even before his experience with the Fords. In 1950, NBC television commissioned him to photograph its lineup of comedians, including Milton Berle, Red Skelton, Groucho Marx and a fast-rising duo named Dean Martin and Jerry Lewis. Halsman noticed that some of the comedians jumped spontaneously while staying in character, and it was unlikely that any of them jumped with more antic enthusiasm than Martin, a crooner and straight man, and Lewis, who gave countless 10-year-old boys a class clown they could look up to.

It may seem like a stretch to go from seeing funnymen jumping for joy to persuading, say, a Republican Quaker vice president to take the leap, but Halsman was always on a mission. ("One of our deepest urges is to find out what the other person is like," he wrote.) And like the true photojournalist he was, Halsman saw a jumpological truth in his near-perfect composition of Martin and Lewis.

In the book, Martin and Lewis appear on a right-hand page, juxtaposed with other famous pairs on the left: songwriters Richard Rodgers and Oscar Hammerstein, and publishers Richard L. Simon and M. Lincoln Schuster. "Each of the four men on the left jumps in a way which is diametrically opposed to the jump of his partner," Halsman wrote. "Their partnerships were lasting and astonishingly successful. The two partners on the right, whose jumps are almost identical, broke up after a few years."

OWEN EDWARDS *is a former critic for* American Photographer *magazine.*

PHILIPPE HALSMAN ESTATE (3)

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MY KIND OF TOWN
BOZEMAN, MONTANA

A Dog Named Wiley

Thanks to one gregarious stray mongrel, a reclusive man finds his place in the pack **BY DAVID QUAMMEN**

THIS IS A STORY of Montana but without horses and cows. The romance of place is not its subject. It will contain no comparisons to Paris in the Twenties or Tangier during the era of Paul Bowles. A river doesn't run through it. The horses and cows belong to other people's Montana stories, not mine; place itself, not the romance of place, is what I want to evoke; and though rivers have in fact been extremely important to my own life in Montana, they aren't the point here. Most of the state's landscape consists of mountains and wide valleys and sage-covered hillsides and high plains transected by long empty stretches of two-lane blacktop, true enough, but this story takes place in town. Its moral, if it has one, is probably: "You never know where you're going until you've been there quite a while." Its central character is a large gray dog of indeterminate lineage and advanced age. But he doesn't make his entrance until later.

Thirty-three years ago I arrived in Montana in a Volkswagen bus, into which was crammed most of what I owned: a fishing rod, a Smith-Corona typewriter and many paperback books. I settled in a town just over the Idaho border, where three rivers converged, and found myself an apartment. It was a college town, eclectic and libertine compared with other parts of Montana at the time. For instance, you could buy a cup of espresso. I thought this might be an agreeable place to live, given the things that I cared about (trout, moun-

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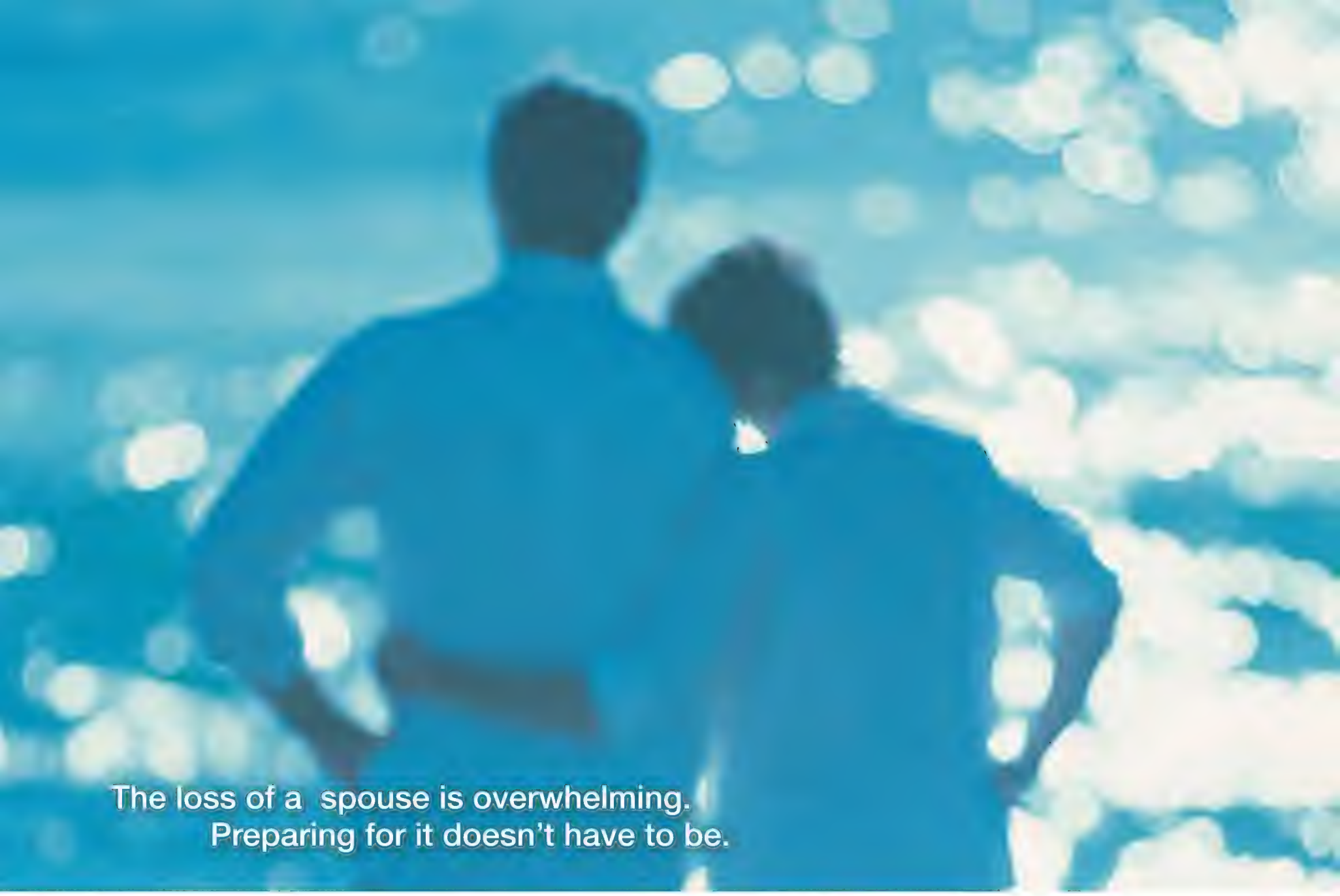

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tains, snow) and the other things (cities, Ohio, august universities) that I hankered to escape; and I assumed that it should be as good as anywhere for a fellow who wanted to become a writer. I had already published one book, but I hadn't yet learned the first crucial lesson about a literary vocation: *Don't quit your day job, not yet!* I'd never even had a day job. Now I discovered I needed one.

Montana wore on me well. The winters were long and severe, which suited the Norwegian side of my genetic predisposition; the people were friendly and trustful; shop clerks and workingmen harbored prideful affection toward the state in which they happened (or chose) to live, and that mere geographical dimension of contentment seemed to help make their lives rather more happy than hard. Very soon, I felt it too.

That's not to say I fell into a life of ease and frolic. There were some years of groping, dues paying, writing and writing but not publishing, frustration, rethinking, adjustment. There was one job, in Butte, that involved reporting to an office. When that ended abruptly, I decided henceforth to scratch out my living as a freelancer. I moved again, this time to a fishing village on another river, an enclave for getaway artists and remittance men. I adopted a cat. I got married. I spent a brief exile in Arizona and returned. Then, in 1984, I fetched up in a town called Bozeman, population about 30,000, in a broad honest valley between the Bridger Mountains and the Gallatins. A year later, I settled onto the small patch of land where I remain anchored today: a narrow lot in a tree-shaded neighborhood just a few blocks south of Bozeman's Main Street.

My life here is quiet. In winters I ski, shovel snow and play hockey with a town-league team composed of wonderful men I wouldn't otherwise know—a roofing contractor, a gun dealer, an insurance adjuster, a software designer and others. In summers I race bicycles with retired but dauntingly fit academics. For part of each year I travel to faraway places, on magazine assignments or for book research; then I come home and sit in my office and write. That's a change from earlier years, when I intended to be a novelist creating books by sheer force of imagination, and when I had no money for plane tickets anyway.

Other things, too, have changed, more cataclysmically, since I came to Bozeman. After 13 years of feeling happy but increasingly cramped in a ramshackle bungalow, my wife and I dismantled the original house, board by board, with skilled help, and built a new one on the same patch of dirt. It's a handsome structure of recycled wood, which cost moderately in dollars and egregiously in other ways. During the course of that project, the marriage became dismantled too. My ex-wife has gone on to a new career, a new situation, in which I'm glad to see her thriving, and I've held onto the house. Or I should say: it has held onto me. Much of its wooden tissue, old two-by-eights of long-grain fir and floorboards of oak, is the same wood I've lived amid since 1985, now reconfigured and repositioned unrecognizably, like flesh from a thigh grafted onto a burn victim's face. That feels weird but good. The mountain ash tree growing snug to the new house is the same mountain ash that hugged the old house. The original cat, long since buried in back beneath an old apple tree, lies there still, now shaded by a new apple tree. The tumbledown shed, where I store a lawn mower and two dusty kayaks, is likewise unchanged. And many of those tattered paperbacks that came with me in the VW bus—including the *Catch-22* inscribed by Joe Heller himself—are still here on the shelves.

I had said some scurrilous things about the canine race.

So much for doddering continuity. I can also report cheerful news of vibrant renewal: three years ago I married a woman who carried her own style of joy, her own large and irrepressible heart, into this half-empty house. I won't try to describe all she has added to my life and to the place where I live it, since that, too, isn't the point, and this essay is short. I'll mention just one crucial thing: she brought with her a large gray dog.

His name was Wiley. She had adopted him years before when he was a roguish young stray who crashed an Earth First! picnic, made himself popular and was rewarded with burgers and cake by the handful. For a while he ran with a rugby team. He was so badly behaved that several times in the early years, he nearly lost his life to irate ranchers incensed at this overgrown cur who was stampeding their livestock. Although his parentage was unknown, from the look of his burly build, his fluffy tail, his thick gray fur, his floppy right ear and his burning orange eyes, he seemed to be the love child of a Great Pyrenees and a wolf. When pressed on the subject, though, his mistress usually passed him off as a "malamute/golden retriever cross," not wanting to add to the misguided vogue for wolf-hybrid pets. He entered my life when she did, almost five years ago, and like her he changed it.

I had never been what you'd call a dog person. That's an understatement. I had felt, spoken and written some scurrilous things about the canine race. But this Wiley was different from any dog I'd ever encountered: more joyous, more handsome, more dignified and laconic (very disinclined to bark), more confident and commanding, yet peaceable. Children could tug at him with impunity. He'd never start a dogfight, but he'd gladly finish one. He had a face that made folks happy from merely gazing into it. He enjoyed trotting up to say hello. He worked crowds like a candidate

ANNE SHERWOOD

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for Congress. I noticed that people around town knew him by name—people who didn't know me and whom I didn't know. He retained his enthusiasm for crashing parties, especially those at which steaks were left unattended on low tables. He was horribly unqualified as a watchdog because he loved everyone; Saddam Hussein or Richard Speck could have snuck in our back door, with or without raw hamburger, and been met with a lick on the hand. Wiley would have done better as a greeter in Reno.

He slept at night on the floor of my office. During cocktail hour he slept on the living room carpet, between my wife's chair and mine. He slept by day in the backyard, and if the weather was wintry, all the better. His fur was so thick he seemed incapable of feeling chilled, and he liked especially to lie out there during a snowstorm, nose to tail, letting the flakes coat him like rime.

Soon after he joined the household, Wiley and I began to walk the neighborhood together in a way I'd never walked it alone. My old solitary morning trudges, usually before dawn, had looped eastward from the house and involved deep concentration, a furrowed brow, no socializing with anybody. I was gathering thoughts for a workday. Now with him I fell into a new habit, going westward three blocks to Cooper Park, a grassy space much favored for the (illegal) leash-free cavorting of dogs. The dogcatcher doesn't patrol this park; it's a scofflaw zone by default and consensus. Here I would unclick Wiley from his leash and let him gallop off to socialize and wrestle and scratch and pee and sniff and defecate (yes, I always had a bag) as he pleased. Meanwhile I would stand jawing with the other dog people—such as Bill, the president of the local Optimist Club; or Marty, the fishing guide who summers in Alaska; or Dave, the retired neurosurgeon with the white ponytail; or Henry, the tall film student; or Barb, the nurse with the broken leg—as they too killed time while indulging their animals: Rosie and Dusty, the hyperkinetic goldens; Quijak, the Samoyed; Merlin and Diesel, black Labs; and Frieda, the doleful Saint Bernard. These are good people and good dogs I wouldn't have known if Wiley hadn't dragged me into their company.

After a few minutes of romping and tussling, Wiley would return to my side and sit, listening patiently, as though to say: *all right, the doggy games are fine, but ultimately I prefer the company of grownups.* Then we'd go home. My wife used to tease us about these very regular morning sessions. My god, she'd say, now I'm surrounded by *two* males addicted to routine.

So we became part of the Cooper Park scene, Wiley and I. And when someone hatched the idea of donating a water fountain to the park for both humans and (by way of a lower dish) dogs, we became part of that too. The fountain was bought with monies gathered from dog-owners, each of whom paid 50 bucks for the privilege of having one canine name engraved on a memorial brick, those bricks to form a cobbling around the fountain. One of the bricks, as eventually laid, said "WILEY." I took him to admire it when the work was done. He was blasé.

Now that he'd settled into domestic life and stopped chasing horses, there was just one problem with Wiley: the problem of time. He had passed his 11th birthday. He acted young but wasn't. And so one day he died.

It was sudden, and therefore merciful to him and shocking to us. It happened six weeks ago as I write this, the day following our annual hockey-team party, which he had attended in full vigor with his usual keen attunement to the presence of friendly humans and loosely guarded meat. Next afternoon he went to sleep in the backyard during a snowstorm, one of his favorite things, and did not wake up. I found him limp, looking peaceful, going cold. Tears streaming, I wrapped him in our best blanket and wondered how on earth to tell my wife when she returned from an evening out.

She mourned him with a depth of pain that put me in mind of Greek tragedy—maybe Hecuba over the corpse of Hector. He'd been with her, like a child, but also as protector and closest confidant, for ten years. I've never seen anyone love a dog more than she loved him. And me, I mourned him in sidelong, bashful ways of my own. We knew that we weren't the only people who had ever cried over a dead dog they'd considered the finest and noblest creature in the history of canines. We knew, yes; but this was our turn.

For the first few days, we hunkered. Word of Wiley's death spread to our friends and acquaintances somewhat faster than we had heart to spread it ourselves. Cards of condolence arrived. One of my hockey teammates and his wife sent flowers. In the hockey culture, that's bold sensitivity. Meanwhile I avoided Cooper Park, at least during the usual hours. I had to leave town on a weekend trip to California anyway. Before departing, I made a brief visit to the park, almost furtively, and did a corny, sentimental thing—I laid a daffodil from our garden on the brick inscribed "WILEY." I figured the flower itself would disappear quickly amid bustling people, bicycles, baby carriages and dogs, but the gesture felt right.

The park was a scofflaw zone by default and consensus.

Another week or more passed before I steeled myself to revisit the park. I was driving by, noticed a cluster of familiar figures, and on impulse I stopped. It was Dave the neurosurgeon, Bill the optimist and Barb the nurse, along with Merlin and Rosie and Dusty and Frieda. As the three people saw me walking up, alone, their faces went long and grim. And now I have come to the point of this essay: the point when I recognized like never before that I don't live just in a house and a state and a town; that I live in a community. We saw the flower, Dave said.

DAVID QUAMMEN *has written 11 books, including* The Reluctant Mr. Darwin.

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OCTOBER ANNIVERSARIES
MOMENTOUS OR MERELY MEMORABLE

75 YEARS AGO GANGSTA RAP

Al Capone, Chicago's most notorious gangster, has reason to smile as the verdict is read: guilty of only 5 of 23 counts of income tax evasion. The decision, handed down October 17, 1931, disappoints federal prosecutors. "Scarface" earns an 11-year prison sentence; good behavior springs him in just over 7. But Capone's crime boss days are over: he is afflicted with syphilitic dementia and dies in 1947, age 48.

225 YEARS AGO CORNWALLIS CONCEDES

After 22 days under siege by land and sea on Virginia's Yorktown peninsula by George Washington's American and French allied forces, British troops led by Lord Charles Cornwallis are sick, outmatched and forced to eat "putrid meat and wormy biscuits." Cornwallis' surrender, on October 19, 1781, ends the last major confrontation of the Revolutionary War, which will conclude by treaty in 1783.

125 YEARS AGO EARPS ERUPT

The Earp brothers, Wyatt, Virgil and Morgan, clash with the Clanton and McLaury clans in Tombstone, Arizona, October 26, 1881. The Earps say the Clantons are thieves; the Clantons claim the Earps are the criminals. Roughly 30 seconds and 30 shots later, a Clanton and two McLaurys are dead. Two decades of revenge killings follow, and the "gunfight at the OK Corral" evolves into legend.

40 YEARS AGO REIGNING SUPREME

Diana Ross, Florence Ballard and Mary Wilson are the toast of Motown when their album "The Supremes A' Go-Go" hits Number 1 on the Billboard 200—a first for a female group—October 22, 1966. The album features the hit song "You Can't Hurry Love." Supremes albums top the chart twice more, but the spot eludes other girl groups until "Beauty and the Beat" in 1982—by the Go-Go's.

120 YEARS AGO LIBERTY FOR ALL

A million people, on foot and in boats of all kinds, flock to New York Harbor for the dedication of the Statue of Liberty on October 28, 1886. Her light, says President Grover Cleveland, "shall pierce through the darkness of ignorance and man's oppression." The 151-foot-tall statue, a gift of friendship from France, will welcome immigrants to these shores for generations.

{ BY BEN BLOCK }

50 YEARS AGO PERFECT PITCH

Hurling his final pitch across the plate for a strike, New York Yankee Don Larsen seals the only perfect game in World Series history, October 8, 1956. His feat—allowing no hitter to reach base—gets Larsen a bear-hug from catcher Yogi Berra, and sets the Yankees on the way to a 4-3 series victory over the Brooklyn Dodgers.

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LUNESTA IS INDICATED FOR THE TREATMENT OF INSOMNIA.

IMPORTANT SAFETY INFORMATION: LUNESTA works quickly, and should be taken right before bed. Be sure you have at least eight hours to devote to sleep before becoming active. Until you know how you'll react to prescription LUNESTA, you should not drive or operate machinery. Do not use alcohol while taking LUNESTA. Most sleep medicines carry some risk of dependency. Side effects may include unpleasant taste, headache, drowsiness and dizziness. See important patient information on the next page.

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FOLLOW THESE TWO SIMPLE STEPS TO TAKE ADVANTAGE OF THIS FREE TRIAL OFFER FOR LUNESTA:

STEP 1: COMPLETE THE FOLLOWING FORM

STEP 2: TEAR IT OUT AND BRING IT TO YOUR DOCTOR

NAME: .....

EMAIL ADDRESS: .....

☐ I WOULD LIKE MORE INFORMATION AND FUTURE OFFERS FOR LUNESTA.

Lunesta™ (eszopiclone) C-IV
1, 2 AND 3 MG TABLETS

Lunesta™
(eszopiclone)c
1, 2 AND 3 MG TABLETS

Please read this summary of information about LUNESTA before you talk to your doctor or start using LUNESTA. It is not meant to take the place of your doctor's instructions. If you have any questions about LUNESTA tablets, be sure to ask your doctor or pharmacist.

LUNESTA is used to treat different types of sleep problems, such as difficulty in falling asleep, difficulty in maintaining sleep during the night, and waking up too early in the morning. Most people with insomnia have more than one of these problems. You should take LUNESTA immediately before going to bed because of the risk of falling.

LUNESTA belongs to a group of medicines known as "hypnotics" or, simply, sleep medicines. There are many different sleep medicines available to help people sleep better. Insomnia is often transient and intermittent. It usually requires treatment for only a short time, usually 7 to 10 days up to 2 weeks. If your insomnia does not improve after 7 to 10 days of treatment, see your doctor, because it may be a sign of an underlying condition. Some people have chronic sleep problems that may require more prolonged use of sleep medicine. However, you should not use these medicines for long periods without talking with your doctor about the risks and benefits of prolonged use.

Side Effects

All medicines have side effects. The most common side effects of sleep medicines are:

- Drowsiness
- Dizziness
- Lightheadedness
- Difficulty with coordination

Sleep medicines can make you sleepy during the day. How drowsy you feel depends upon how your body reacts to the medicine, which sleep medicine you are taking, and how large a dose your doctor has prescribed. Daytime drowsiness is best avoided by taking the lowest dose possible that will still help you sleep at night. Your doctor will work with you to find the dose of LUNESTA that is best for you. Some people taking LUNESTA have reported next-day sleepiness.

To manage these side effects while you are taking this medicine:

- When you first start taking LUNESTA or any other sleep medicine, until you know whether the medicine will still have some effect on you the next day, use extreme care while doing anything that requires complete alertness, such as driving a car, operating machinery, or piloting an aircraft.
- Do not drink alcohol when you are taking LUNESTA or any sleep medicine. Alcohol can increase the side effects of LUNESTA or any other sleep medicine.
- Do not take any other medicines without asking your doctor first. This includes medicines you can buy without a prescription. Some medicines can cause drowsiness and are best avoided while taking LUNESTA.
- Always take the exact dose of LUNESTA prescribed by your doctor. Never change your dose without talking to your doctor first.

Special Concerns

There are some special problems that may occur while taking sleep medicines.

Memory Problems

Sleep medicines may cause a special type of memory loss or "amnesia." When this occurs, a person may not remember what has happened for several hours after taking the medicine. This is usually not a problem since most people fall asleep after taking the medicine. Memory loss can be a problem, however, when sleep medicines are taken while traveling, such as during an airplane flight and the person wakes up before the effect of the medicine is gone. This has been called "traveler's amnesia." Memory problems have been reported rarely by patients taking LUNESTA in clinical studies. In most cases, memory problems can be avoided if you take LUNESTA only when you are able to get a full night of sleep before you need to be active again. Be sure to talk to your doctor if you think you are having memory problems.

Tolerance

When sleep medicines are used every night for more than a few weeks, they may lose their effectiveness in helping you sleep. This is known as "tolerance." Development of tolerance to LUNESTA was not observed in a clinical study of 6 months' duration. Insomnia is often transient and intermittent, and prolonged use of sleep medicines is generally not necessary. Some people, though, have chronic sleep problems that may require more prolonged use of sleep medicine. If your sleep problems continue, consult your doctor, who will determine whether other measures are needed to overcome your sleep problems.

Dependence

Sleep medicines can cause dependence in some people, especially when these medicines are used regularly for longer than a few weeks or at high doses. Dependence is the need to continue taking a medicine because stopping it is unpleasant.

When people develop dependence, stopping the medicine suddenly may cause unpleasant symptoms (see *Withdrawal* below). They may find they have to keep taking the medicine either at the prescribed dose or at increasing doses just to avoid withdrawal symptoms.

All people taking sleep medicines have some risk of becoming dependent on the medicine. However, people who have been dependent on alcohol or other drugs in the past may have a higher chance of becoming addicted to sleep medicines. This possibility must be considered before using these medicines for more than a few weeks. If you have been addicted to alcohol or drugs in the past, it is important to tell your doctor before starting LUNESTA or any sleep medicine.

Withdrawal

Withdrawal symptoms may occur when sleep medicines are stopped suddenly after being used daily for a long time. In some cases, these symptoms can occur even if the medicine has been used for only a week or two. In mild cases, withdrawal symptoms may include unpleasant feelings. In more severe cases, abdominal and muscle cramps, vomiting, sweating, shakiness, and, rarely, seizures may occur. These more severe withdrawal symptoms are very uncommon. Although withdrawal symptoms have not been observed in the relatively limited controlled trials experience with LUNESTA, there is, nevertheless, the risk of such events in association with the use of any sleep medicine.

Another problem that may occur when sleep medicines are stopped is known as "rebound insomnia." This means that a person may have more trouble sleeping the first few nights after the medicine is stopped than before starting the medicine. If you should experience rebound insomnia, do not get discouraged. This problem usually goes away on its own after 1 or 2 nights.

If you have been taking LUNESTA or any other sleep medicine for more than 1 or 2 weeks, do not stop taking it on your own. Always follow your doctor's directions.

Changes In Behavior And Thinking

Some people using sleep medicines have experienced unusual changes in their thinking and/or behavior. These effects are not common. However, they have included:

- More outgoing or aggressive behavior than normal
- Confusion
- Strange behavior
- Agitation
- Hallucinations
- Worsening of depression
- Suicidal thoughts

How often these effects occur depends on several factors, such as a person's general health, the use of other medicines, and which sleep medicine is being used. Clinical experience with LUNESTA suggests that it is rarely associated with these behavior changes.

It is also important to realize it is rarely clear whether these behavior changes are caused by the medicine, are caused by an illness, or have occurred on their own. In fact, sleep problems that do not improve may be due to illnesses that were present before the medicine was used. If you or your family notice any changes in your behavior, or if you have any unusual or disturbing thoughts, call your doctor immediately.

Pregnancy And Breastfeeding

Sleep medicines may cause sedation or other potential effects in the unborn baby when used during the last weeks of pregnancy. Be sure to tell your doctor if you are pregnant, if you are planning to become pregnant, or if you become pregnant while taking LUNESTA.

In addition, a very small amount of LUNESTA may be present in breast milk after use of the medication. The effects of very small amounts of LUNESTA on an infant are not known; therefore, as with all other prescription sleep medicines, it is recommended that you not take LUNESTA if you are breastfeeding a baby.

Safe Use Of Sleep Medicines

To ensure the safe and effective use of LUNESTA or any other sleep medicine, you should observe the following cautions:

1. LUNESTA is a prescription medicine and should be used ONLY as directed by your doctor. Follow your doctor's instructions about how to take, when to take, and how long to take LUNESTA.
2. Never use LUNESTA or any other sleep medicine for longer than directed by your doctor.
3. If you notice any unusual and/or disturbing thoughts or behavior during treatment with LUNESTA or any other sleep medicine, contact your doctor.
4. Tell your doctor about any medicines you may be taking, including medicines you may buy without a prescription and herbal preparations. You should also tell your doctor if you drink alcohol. DO NOT use alcohol while taking LUNESTA or any other sleep medicine.
5. Do not take LUNESTA unless you are able to get 8 or more hours of sleep before you must be active again.
6. Do not increase the prescribed dose of LUNESTA or any other sleep medicine unless instructed by your doctor.
7. When you first start taking LUNESTA or any other sleep medicine, until you know whether the medicine will still have some effect on you the next day, use extreme care while doing anything that requires complete alertness, such as driving a car, operating machinery, or piloting an aircraft.
8. Be aware that you may have more sleeping problems the first night or two after stopping any sleep medicine.
9. Be sure to tell your doctor if you are pregnant, if you are planning to become pregnant, if you become pregnant, or if you are breastfeeding a baby while taking LUNESTA.
10. As with all prescription medicines, never share LUNESTA or any other sleep medicine with anyone else. Always store LUNESTA or any other sleep medicine in the original container and out of reach of children.
11. Be sure to tell your doctor if you suffer from depression.
12. LUNESTA works very quickly. You should only take LUNESTA immediately before going to bed.
13. For LUNESTA to work best, you should not take it with or immediately after a high-fat, heavy meal.
14. Some people, such as older adults (i.e., ages 65 and over) and people with liver disease, should start with the lower dose (1 mg) of LUNESTA. Your doctor may choose to start therapy at 2 mg. In general, adults under age 65 should be treated with 2 or 3 mg.
15. Each tablet is a single dose; do not crush or break the tablet.

Note: This summary provides important information about LUNESTA. If you would like more information, ask your doctor or pharmacist to let you read the Prescribing Information and then discuss it with him or her.

Rx only

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Lunesta™
(eszopiclone)c
1, 2 AND 3 MG TABLETS

Void where prohibited by law. Offer not available in New York State.
New York State residents can go to Lunesta.com and download a $25 rebate.

EXPIRATION DATE: 11/3/2006
Good for 7 tablets Lunesta only
(Please check mg strength)

☐ 1mg ☐ 2mg ☐ 3mg

Limit One TrialScript® voucher per patient. Redeem for product only when accompanied by a valid, signed prescription for LUNESTA.
Submit claim to McKesson Specialty Arizona Inc. using BIN #610500. For pharmacy processing questions, please call the Help Desk at 1-800-750-9835.

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Around the Mall

SCENES AND SIGHTINGS FROM THE SMITHSONIAN MUSEUMS AND BEYOND

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GENESIS

While the Bible's content has obviously had a major impact on the world, what's less well known is how its format would alter publishing forever. A new exhibition, "In the Beginning: Bibles Before the Year 1000,"

The codex, says Ann Gunter (examining a nearly intact page from a 5th- to 7th-century Coptic Psalter and with an illustrated 7th-century Bible), "changed the way people accessed information."

CLAUDIO VAZQUEZ

BIBLE

{ CONTINUED FROM PAGE 27 }

at the Arthur M. Sackler Gallery, tells the Bible's own genesis story. The exhibition represents perhaps the most important collection of early biblical manuscripts ever shown in the United States. There are more than 80 key biblical artifacts, including the oldest known copy of the Book of Numbers and the earliest set of scriptures with full-page illustrations. "The show is about the evolution of this book we are so familiar with," says curator Ann Gunter. "Few people know about the way its content and format changed over time."

Early Christians published the first biblical manuscripts in codex form, a prototype of the modern book with bound pages and a wood covering. The format was a radical one because bound books were considered second class; almost all lengthy texts at the time were published on scrolls. But with its hard cover and compact size, the codex traveled better than a scroll and could be opened flat and have page numbers, which made for easier reading. Also important, in a time when church authorities had begun debating just which writings should be in the biblical canon, the codex allowed separate texts like the Gospels and letters of Paul to be assembled into a single document.

Covers (a 6th-century Byzantine example) made codices portable; art added meaning, value.

Early Christians created the first Bibles by cutting folios from papyrus, stitching the pages in the middle, and writing the text in long columns. One early example in the show, the Chester Beatty Codex from A.D. 150, is only about four inches wide and seven inches tall. Over the next few centuries, as the church continued to standardize the canon, professional scribes began creating codices that were easier to read aloud, adding spaces between words, writing chapter headings and using parchment instead of papyrus. These codices were difficult to make and highly prized. A Bible in the exhibition with purple vellum pages and gold leaf script, the Codex Aureus, was stolen by ninth-century Vikings from a church in Kent, England; a local earl paid a ransom in "pure gold" for its return.

By the year 1000, the Bible had long been codified, with an Old Testament containing the Hebrew Bible and a New Testament of 27 chapters. And the codex had replaced the scroll as the standard way to publish texts in the West. "This was the biggest technological change [in the history of the book] until the printing press," says Gunter.

But variations in individual Bible design didn't end. Communities translated the text into their local languages and added elaborate silver covers and detailed illustrative elements, including portraits. Says guest curator and University of London professor Michelle Brown, "People received the scriptures and made them their own." { BY ULRICH BOSER }

Art of politics: González Camarena's 1946 *Bountiful Mexico.*

Miracles and Murals

Diego Rivera's 15- by 32-foot sketch might be the official star of the show, but numerous folk art pieces steal the spotlight, from vibrant "miracle" paintings that honor saints to a portrait made out of feathers. The exhibition of Mexican works, on view through November 2 at the S. Dillon Ripley Center, is organized by the Smithsonian Latino Center and the Museo Soumaya in Mexico City, and draws on the private art collection of Mexico City telecommunications billionaire Carlos Slim. Most of the works have never been displayed outside Mexico.

Rivera created his charcoal-on-paper sketch in 1952 for *Nightmare of War, Dream of Peace*, a mural that was lost some years later. In the sketch, Stalin offers Uncle Sam a dove, a laborer leads the people toward Stalin and Mao, a mushroom cloud rises, and an indigenous woman walks with her children. Frida Kahlo, Rivera's wife and fellow artist, sits in a wheelchair among the people.

The muralists David Alfaro Siqueiros, José Clemente Orozco and Jorge González Camarena are also represented in the show—and so is Rufino Tamayo, who opposed the muralists' politically driven art. His boldly colored paintings of local people and street scenes—one is 1954's *Watermelon Vendor*—combine elements of Cubism and folk art. "Some of our most remarkable images are linked to the indigenous universe, rich in myths," says Mónica López-Velarde Estrada, curator at the Museo Soumaya, which holds Slim's collection.

Many works reveal the blending of formal and folk influences in art, and colonial and Native influences in history. A portrait of the Virgen de Guadalupe, the brown-skinned Catholic icon, uses the Native technique of constructing images out of feathers. { BY KATY JUNE-FRIESEN }

PHOTO BY JAVIER HINOJOSA / COL. MUSEO SOUMAYA; DUMBARTON OAKS, WASHINGTON, DC

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FROM THE SECRETARY | Wanted!

Our fossil collection is already the world's largest. But we're in search of a complete *T. rex*

FOR MOST 4- to 8-year-olds and for adventurers of all ages, Jack Horner has a dream job with max cool assignments—like being helicoptered into Montana's badlands to hunt for a *Tyrannosaurus rex*, the toothsome terror also known as *T. rex*. Dr. Horner is curator of paleontology at the Museum of the Rockies and senior scholar at the Smithsonian's National Museum of Natural History (NMNH). He discovered the first dinosaur nests with embryos in the Western Hemisphere and the first evidence that some dinosaurs may have cared for their young.

Last summer Dr. Horner began the search for another first. He and a research team were dropped into an area in eastern Montana, where there is a fossil-rich formation deposited at the end of the Age of Dinosaurs, about 68 million years ago. There they hope to secure for the Smithsonian an original, exhibit-quality *T. rex* skeleton. (NMNH currently holds a number of *T. rex* bones. But the *T. rex* skeleton on display at the museum is a cast.)

A full *T. rex* skeleton would be a great addition to a paleobiology department whose origins date back well over 100 years. The Smithsonian's first dinosaur specimens, some of which were also found in Montana, were collected in the late 1800s. NMNH's full *Triceratops* skeleton, which a few years ago became the world's first anatomically accurate Digital Dinosaur (based on a precise 3-D scan), was originally mounted in 1905. And it was Smithsonian secretary Charles Walcott who, in 1909, first discovered the famous 505-million-year-old Burgess Shale fauna in the Canadian Rockies. These fossils, with unusually fine detail, are on permanent exhibit at NMNH.

Today the Smithsonian continues to be a leading center for paleontological research. And the NMNH Department of Paleobiology certainly represents the "history" in the museum's title. It holds more than 40 million fossils—the world's largest collection and one of the most diverse and most historically and scientifically significant. The plant and animal fossils include early traces of life on earth, more than two billion years old, and fossils, like those of woolly mammoths, "only" 10,000 to 20,000 years old.

The *T. rex* at the National Museum of Natural History is scary enough, but it's merely a cast.

Studying and caring for these fossils, as well as working at sites on every continent, on every ocean and in every region in the United States, are the 35 people who call the Department of Paleobiology home. They include 12 curators, internationally recognized experts in their fields who are constantly uncovering and describing evidence of past life. They reconstruct the relationships between extinct organisms and their environments, including taking a closer look at the greatest extinction event in earth's history, when more than 90 percent of marine species disappeared. And they increase our understanding of how conditions on earth have influenced evolution over time, such as how dinosaurs rose to dominance, and later how the ice ages affected the human lineage.

NMNH is in the early stages of developing a plan to ensure that this groundbreaking research and the museum's holdings are displayed in completely renovated paleontology halls. These new halls will allow visitors to learn, often firsthand from Smithsonian scientists, that the diversity of life is both staggering and ancient. The halls will continue to highlight the dinosaurs, but they will do so in a new and engaging way—by placing them (and museum visitors) in the context of their communities and changing environments.

The Smithsonian's *T. rex* project is generously supported by Smithsonian National Board member Edgar Masinter and his wife, Margery. Dr. Horner has promised that "we will find you a *T. rex*." When he does, it will be the cornerstone of the renovated dinosaur halls. And it will remind millions of visitors that the treasures of NMNH include not just the paleobiology department's fossil collection, but the department itself.

LAWRENCE M. SMALL
SECRETARY OF THE SMITHSONIAN INSTITUTION

Visit Smithsonian.com for more dinosaur pictures.

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THE OBJECT AT HAND

Patent Model

NATIONAL MUSEUM OF AMERICAN HISTORY

INVENTIVE ABE

In 1849, a future president patented an ingenious addition to transportation technology

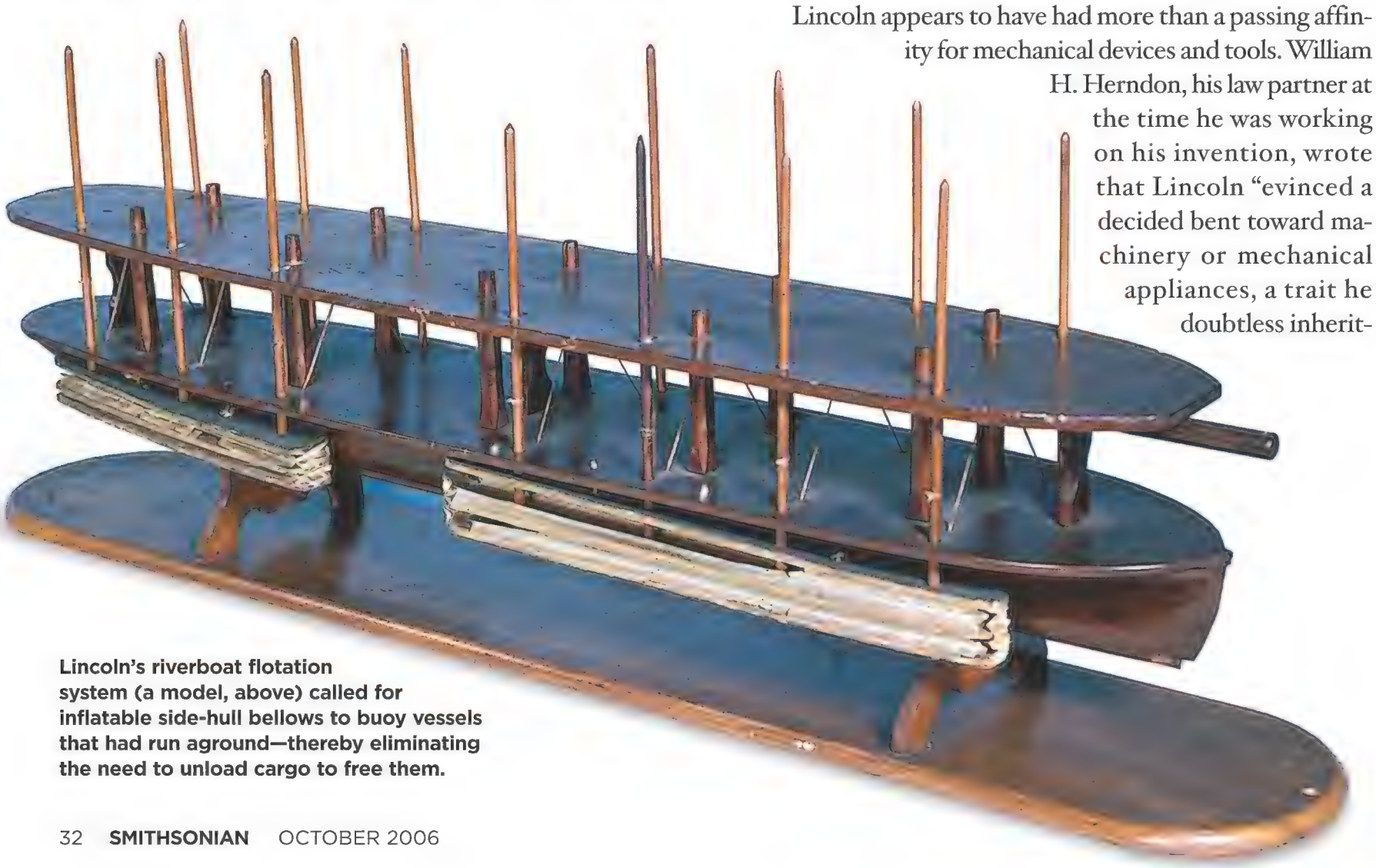
BY OWEN EDWARDS

UPON HEARING the name Abraham Lincoln, many images may come to mind: rail-splitter, country lawyer, young congressman, embattled president, Great Emancipator, assassin's victim, even the colossal face carved into Mount Rushmore. One aspect of this multidimensional man that probably doesn't occur to anyone other than avid readers of Lincoln biographies (and SMITHSONIAN) is that of inventor. Yet before he became the 16th president of the United States, Lincoln, who had a long fascination with how things worked, invented a flotation system for lifting riverboats stuck on sandbars.

Though his invention was never manufactured, it serves to give Lincoln yet another honor: he remains the only U.S. president to have a patent in his name. According to Paul Johnston, curator of maritime history at the National Museum of American History (NMAH), Lincoln's eminence and the historical rarity of his patent make the wooden model he submitted to the Patent Office "one of the half dozen or so most valuable things in our collection."

Lincoln's patent, No. 6,469, was granted on May 22, 1849, for a device for "Buoying Vessels Over Shoals," when he was back in Springfield practicing law after one term as an Illinois congressman in Washington. His idea, to equip boats with inflatable bellows of "india-rubber cloth, or other suitable water-proof fabric" levered alongside the hull, came as a result of river and lake expeditions he made as a young man, ferrying people and produce on the Mississippi and the Great Lakes. At least twice his boats ran aground on sandbars or hung up on other obstacles; given the Big River's ever-shifting shallows, such potentially dangerous misadventures happened often. Freeing a beached vessel usually involved the laborious unloading of cargo until the boat rode high enough to clear the snag. According to Harry R. Rubenstein, chair of the Division of Politics and Reform at NMAH, Lincoln "was keenly interested in water transportation and canal building, and enthusiastically promoted both when he served in the Illinois legislature." He was also an admirer of patent law, famously declaring that it "added the fuel of interest to the fire of genius."

Lincoln appears to have had more than a passing affinity for mechanical devices and tools. William H. Herndon, his law partner at the time he was working on his invention, wrote that Lincoln "evinced a decided bent toward machinery or mechanical appliances, a trait he doubtless inherit-



Lincoln's riverboat flotation system (a model, above) called for inflatable side-hull bellows to buoy vessels that had run aground—thereby eliminating the need to unload cargo to free them.

GRANGER COLLECTION, NEW YORK; ALFRED HARRELL

Frustrated by frequent urges in your internal plumbing? Annoyed you can't always do things spur of the moment?

There's a treatment you can discuss with your doctor.

Frequent bladder urges can sometimes get in the way of doing things spontaneously. So talk to your doctor today to see if prescription VESIcare can help.

Taken once a day, VESIcare can reduce frequent urges and may help effectively manage bladder leakage, day and night. It doesn't have to be a pipe dream.

Call (800) 403-6565
vesicare.com

Here's what you'll receive:

- **Information about overactive bladder**
- **$25 savings check***
- **Talk to your doctor guide**

Important Safety Information

VESIcare is for urgency, frequency, and leakage (overactive bladder). VESIcare is not for everyone. If you have certain types of stomach, urinary, or glaucoma problems do not take VESIcare. While taking VESIcare, if you experience a serious allergic reaction, severe abdominal pain, or become constipated for three or more days, tell your doctor right away. In studies, common side effects were dry mouth, constipation, blurred vision, and indigestion.

Please see important product information on the following page.

***Subject to eligibility. Restrictions may apply.**

VESIcare®
(solifenacin succinate) tablets

Partnership for Prescription Assistance

If you don't have prescription coverage, visit pparx.org, or call 1-888-4PPA-NOW (1-888-477-2669)

Patient Information
VESIcare® – (VES-ih-care)
(solifenacin succinate)

VESIcare®
(solifenacin succinate)
tablets

Read the Patient Information that comes with VESIcare before you start taking it and each time you get a refill. There may be new information. This leaflet does not take the place of talking with your doctor or other healthcare professional about your condition or treatment. Only your doctor or healthcare professional can determine if treatment with VESIcare is right for you.

What is VESIcare®?
VESIcare is a prescription medicine used in adults to treat the following symptoms due to a condition called overactive bladder:
- Having to go to the bathroom too often, also called "urinary frequency,"
- Having a strong need to go to the bathroom right away, also called "urgency,"
- Leaking or wetting accidents, also called "urinary incontinence."

VESIcare has not been studied in children.

What is overactive bladder?
Overactive bladder occurs when you cannot control your bladder contractions. When these muscle contractions happen too often or cannot be controlled, you can get symptoms of overactive bladder, which are urinary frequency, urinary urgency, and urinary incontinence (leakage).

Who should NOT take VESIcare®?
Do not take VESIcare if you:
- are not able to empty your bladder (also called "urinary retention"),
- have delayed or slow emptying of your stomach (also called "gastric retention"),
- have an eye problem called "uncontrolled narrow-angle glaucoma",
- are allergic to VESIcare or any of its ingredients. See the end of this leaflet for a complete list of ingredients.

What should I tell my doctor before starting VESIcare®?
Before starting VESIcare tell your doctor or healthcare professional about all of your medical conditions including if you:
- have any stomach or intestinal problems or problems with constipation,
- have trouble emptying your bladder or you have a weak urine stream,
- have an eye problem called narrow-angle glaucoma,
- have liver problems,
- have kidney problems,
- are pregnant or trying to become pregnant (It is not known if VESIcare can harm your unborn baby.),
- are breastfeeding (It is not known if VESIcare passes into breast milk and if it can harm your baby. You should decide whether to breastfeed or take VESIcare, but not both.).

Before starting on VESIcare, tell your doctor about all the medicines you take including prescription and nonprescription medicines, vitamins, and herbal supplements. While taking VESIcare, tell your doctor or healthcare professional about all changes in the medicines you are taking including prescription and nonprescription medicines, vitamins and herbal supplements. VESIcare and other medicines may affect each other.

How should I take VESIcare®?
Take VESIcare exactly as prescribed. Your doctor will prescribe the dose that is right for you. Your doctor may prescribe the lowest dose if you have certain medical conditions such as liver or kidney problems.
- You should take one VESIcare tablet once a day.
- You should take VESIcare with liquid and swallow the tablet whole.
- You can take VESIcare with or without food.
- If you miss a dose of VESIcare, begin taking VESIcare again the next day. Do not take 2 doses of VESIcare in the same day.
- If you take too much VESIcare or overdose, call your local Poison Control Center or emergency room right away.

What are the possible side effects with VESIcare®?
The most common side effects with VESIcare are:
- blurred vision. Use caution while driving or doing dangerous activities until you know how VESIcare affects you.
- dry mouth.
- constipation. Call your doctor if you get severe stomach area (abdominal) pain or become constipated for 3 or more days.
- heat prostration. Heat prostration (due to decreased sweating) can occur when drugs such as VESIcare are used in a hot environment.

Tell your doctor if you have any side effects that bother you or that do not go away.
These are not all the side effects with VESIcare. For more information, ask your doctor, healthcare professional or pharmacist.

How should I store VESIcare®?
- Keep VESIcare and all other medications out of the reach of children.
- Store VESIcare at room temperature, 50° to 86°F (15° to 30° C). Keep the bottle closed.
- Safely dispose of VESIcare that is out of date or that you no longer need.

General information about VESIcare®
Medicines are sometimes prescribed for conditions that are not mentioned in patient information leaflets. Do not use VESIcare for a condition for which it was not prescribed. Do not give VESIcare to other people, even if they have the same symptoms you have. It may harm them.

This leaflet summarizes the most important information about VESIcare. If you would like more information, talk with your doctor. You can ask your doctor or pharmacist for information about VESIcare that is written for health professionals. You can also call (866) 972-4636 toll free, or visit www.VESICARE.com.

What are the ingredients in VESIcare®?
Active ingredient: solifenacin succinate
Inactive ingredients: lactose monohydrate, corn starch, hypromellose 2910, magnesium stearate, talc, polyethylene glycol 8000 and titanium dioxide with yellow ferric oxide (5 mg VESIcare tablet) or red ferric oxide (10 mg VESIcare tablet)

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Norman, Oklahoma 73072

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A Trip to Australia Reveals the Wonder of Giant Golden Pearls

Just before 1900, in a small isolated town called Broome Australia, fishermen came across the rarest oyster-a giant named the Pinctada maxima. This world's largest oyster contained the voluptuous South Sea Pearl—the most sought after pearl in the world. After this discovery, Broome soon became the dominant pearl trading post in the world and literally 80% of all worldwide pearl trading passed through Broome.

A trip to Broome. We took the long trip to Australia to study the famous white lipped oysters that produced magnificent pearls that are often 11-14mm—about 8 times the size (and 8 times the price!) of a standard pearl. Not only did these oysters produce the rare South Sea pearl, but they also produced a tremendous amounts of mother of pearl or nacre. Nacre is the lustrous iridescent substance which is secreted by the oyster to form the shiny inside of their shells. When nacre secretions are deposited around the pearl seed they build up to form a full sized pearl. Our bio-scientists went to work to see if we could improve upon Mother Nature's process a little. By extracting the seed pearl from young oyster shells and speeding up the process in the lab, we coated these natural seed pearls with nacre from the inside of the giant shells, and were able to produce the breathtaking lab-coated Australian Pacific Pearl.

Golden beauties. These golden enhanced organic pearls are extremely large in size—12mm—but they are much more consistent in shape than ordinary pearls that have to be extracted from 4-5 year old oysters that are dead. They are also less porous so you don't have to worry about perfumes or cosmetics discoloring these pearls like you do with ordinary pearls. In a more ecologically friendly approach, the Australian Pacific pearl seed is extracted from fresh oyster shells and then organically micro-coated in the laboratory with the same nacre that coats naturally grown pearls. Giant 12mm golden South Sea pearls can cost up to $50,000 for an 18" strand. Why even think about that when you can now wear an 18" strand of 12mm lab-coated enhanced Australian Pacific Pearls with a consistently round shape and a rare golden color for under $300.

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ed from his father who was himself something of a mechanic. . . . "

The precise source of the model of the flotation device is unclear, though there's no doubt that the ingenuity behind it was Lincoln's. Herndon wrote about Lincoln bringing the wooden boat model into the law office, "and while whittling on it would descant on its merits and the revolution it was destined to work in steamboat navigation." A Springfield mechanic, Walter Davis, was said to have helped with the model, which was just over two feet long. But Johnston thinks it's possible that the detailed miniature Lincoln submitted may have been made by a model maker in Washington who specialized in aiding inventors. "The name engraved on top of the piece is 'Abram Lincoln,'" Johnston says. "It doesn't seem likely that if Lincoln had actually made this model, he'd have misspelled his own first name." Johnston says that the answer—yet undetermined—may lie in whether the misspelled name is also engraved under the original varnish, indicating the model to be a commission.

The patent application for the device has a similar mystery. Part of the U.S. Patent Office collection, the document describes in detail how "by turning the main shaft or shafts in one direction, the buoyant chambers will be forced downwards into the water and at the same time expanded and filled with air." But it is missing the inventor's signature. Someone, probably in the early 20th century, cut Abe's signature out of the document—the autograph collector as vandal.

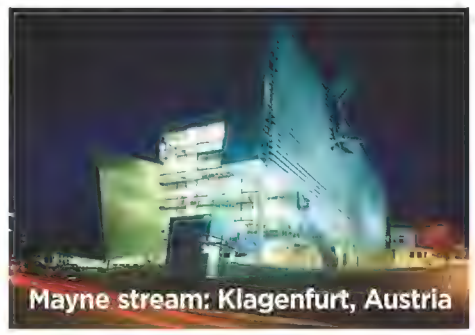
Since no one ever tried to put the invention to use, we can't know for sure if it would have led to the revolution in steamboat navigation that Lincoln predicted. But "it likely would not have been practical," says Johnston, "because you need a lot of force to get the buoyant chambers even two feet down into the water. My gut feeling is that it might have been made to work, but Lincoln's considerable talents lay elsewhere."

OWEN EDWARDS *is executive editor of* Edutopia, *a magazine about education.*

Q&A

THOM MAYNE, a progressive architect in Santa Monica, California, has won a National Design Award, to be presented this month by the Smithsonian's Cooper-Hewitt Museum. He spoke with Katy June-Friesen.

DESCRIBE THE NEW ORLEANS JAZZ PARK YOU'VE BEEN ASKED TO DESIGN. It's a 17-acre, four-block-long park that contains pavilions for performances and the jazz center itself, and a new courthouse and the chambers portion of the city hall. It looks like it's going to include some housing and other pieces, which we're still developing. It will clearly become the civic—and music, and entertainment—center of the city.



Mayne stream: Klagenfurt, Austria

IT'S SAID YOU'VE BEEN BUILDING "GREEN." WHAT DOES THAT MEAN TO YOU? We have a building [the San Francisco Federal Building], and we've taken the air conditioning out of its tower—out of about 70 percent of it—and all of a sudden we're, like, green architects. We naturally ventilated it, which sounds so simple but is actually incredibly complicated. I think green architecture is a 1960s and '70s idea that became kind of [single-minded]. I'm interested in a broader set of issues: ecology, political and economic reality, construction techniques and technology.

WOULD YOU HAVE THOUGHT 30 YEARS AGO THAT YOU'D BE WORKING WITH THE GOVERNMENT NOW? Not at all. My friends all tease me it couldn't have been more unlikely. . . . It amazes me that you find people who are in alignment with your ideas. And in that case, it's not about being radical, it's just solving problems straight ahead; looking at the workforce and challenging notions about what workplaces are.

SO ARE YOU STILL EMBRACING THE "BAD BOY" OR "OUTSIDER" MONIKER? Well, you have to be outside to be an artist. It's not just making beautiful things, it's making things that speak about the world and represent some sort of critique.

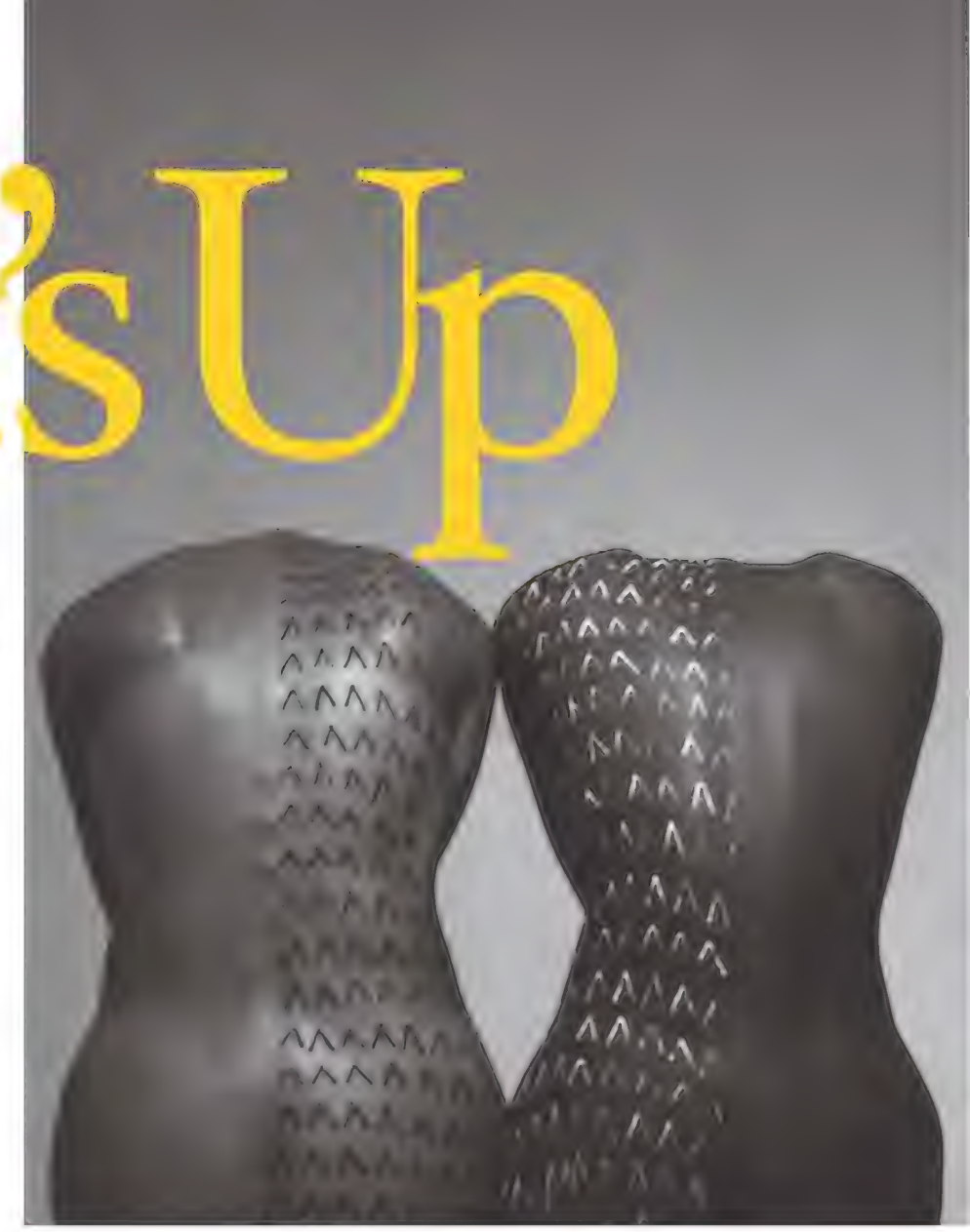
Visit Smithsonian.com for more of the Q&A with Thom Mayne.

Who's Counting?

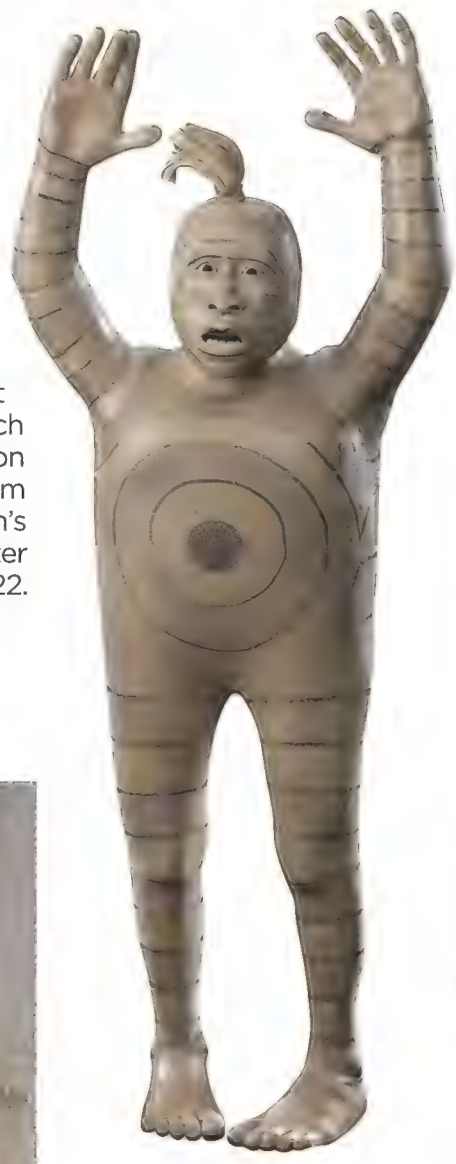
211 works of art by Pablo Picasso are in the collection of the Hirshhorn Museum and Sculpture Garden (his 1934 *Woman in a Hat*). The artist was born in Málaga, Spain, 125 years ago this month.

MARK HANAUER; KIM ZWARTS; HIRSHHORN MUSEUM AND SCULPTURE GARDEN, S.I.

What's Up



BODY LANGUAGE New York City-based photographer Iké Udé puts a modern stamp on *uli*, body-painting motifs of the Igbo people of his native Nigeria. Recent works by Udé and others are at the Museum of African Art until April 6.



NEO-TRADITIONAL

Some Native American artists delight in updating traditional forms with fresh subject matter (Roxanne Swentzell's 1990 clay figure *Hands Up!* pokes fun at Hollywood westerns). Such cutting-edge classics are on view at the National Museum of the American Indian's George Gustav Heye Center in New York until July 22.

NEW STRIPES

Cute? Definitely. But the National Zoo's Sumatran tiger cubs (two females and a male), born May 24, are also something of a hedge against extinction: no more than 500 of the subspecies exist in the wild.

{ BY AMY CRAWFORD }

LOST AND FOUND

One man's trash is another's . . . postmodern sculpture? Dead batteries, styrofoam toys and old shipping pallets (Franz West's *Caiphas & Kepler*) find their way into fine art at the Hirshhorn starting October 26.

PRIME REAL ESTATE

Helen Frankenthaler painted in a garage. Mark Rothko (right, in 1952) had a "big sunny room." Willem de Kooning paid $50 a month for his Manhattan studio. (Hey, it was 1953.) At the Portrait Gallery until October 27, photos of artists' spaces, plus their notes and letters from the Archives of American Art, offer a rare peek at masters at work.

CLOCKWISE FROM TOP RIGHT: ID ' UD ' ; GAGOSIAN MUSEUM, NEW YORK; KAY BELL REYNAL / ARCHIVES OF AMERICAN ART; JESSIE COHEN / NATIONAL ZOO/ APIMAGES; WALTER LARRIMORE

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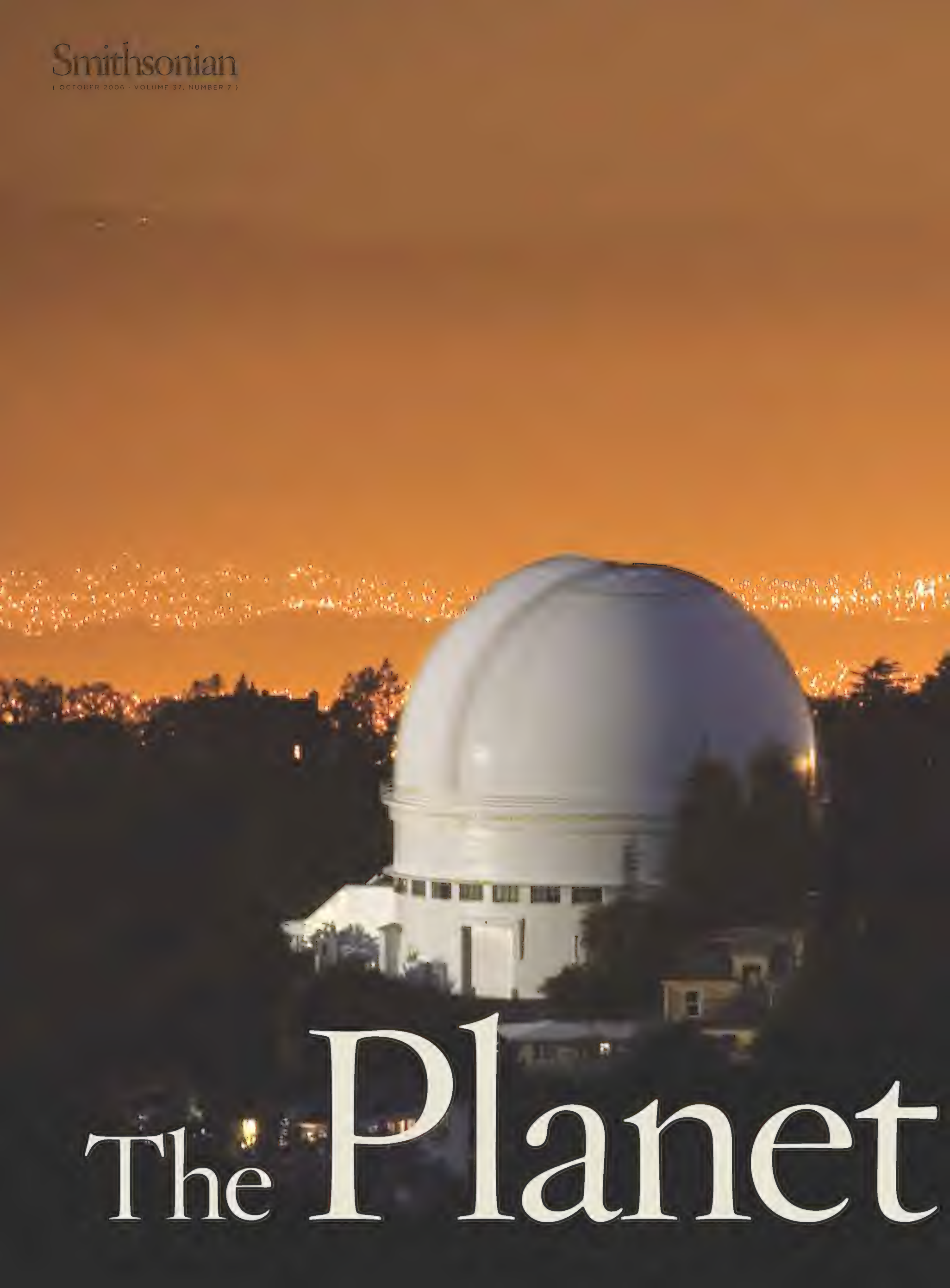

The Planet

Scanning the night sky, astronomers wielding conventional telescopes (the Lick Observatory near San Jose) have gleaned evidence of new worlds.

Hunters

Nevermind the demotion of Pluto to a dwarf planet. Astronomers have found about 200 planets orbiting other stars, and they say it's only a matter of time before they discover another Earth

BY ROBERT IRION

PHOTOGRAPHS BY PETER MENZEL

It's a challenging night for astronomy at Lick Observatory near San Jose, California. The lights of Silicon Valley shimmer below the 4,200-foot summit of Mount Hamilton, washing out the faintest stars. Clouds drift closer from the north with a threat of rain. On the mountaintop are ten telescope domes, and I walk up a steep driveway to the biggest one. There's an eerie sound, like a loose shutter groaning in the wind. It's the dome itself, creaking as it rotates to keep its opening centered above the slowly moving telescope inside.

Chris McCarthy, an astronomer at San Francisco State University (SFSU), greets me at a side door. Wearing a small light strapped to his head, he leads me up metal stairways through the dome's interior, kept inky dark for nighttime observations, and into the warm control room. There, Howard Isaacson, an SFSU senior, and Keith Baker, a telescope technician, sit at computer screens amid thick bundles of cables and racks of antiquated electronics. McCarthy and Isaacson chat and sip hot tea while Baker uses his computer mouse to adjust the telescope. Before dawn, the astronomers will gather light from dozens of stars. Some of the stars, they hope, harbor new worlds.

How do you find an extrasolar planet? Astronomer Chris McCarthy (inside a dome at Lick) looks for stars that wobble.

In an era of rovers exploring Mars and space-based telescopes taking dazzling pictures of the cosmos from above the murk of Earth's atmosphere, the routine at Lick—pointing a 47-year-old telescope at star after star for hours on end—feels rather quaint. Yet these astronomers are members of a team that is the best in the planet-hunting business. Using telescopes in Hawaii, Chile and Australia, as well as those at the Lick Observatory, to monitor about 2,000 stars—most of them quiet and middle-aged like our sun and close enough to Earth for big telescopes to get a clear view of their movements—the team has found about two-thirds of the 200 or so planets discovered outside our solar system so far. (The recent hubbub about how to define a planet in our solar system hasn't threatened the planetary status of these distant objects.)

Some of the newfound extrasolar planets, or exoplanets, as they are called, are giant worlds the size of Jupiter that circle their stars on tight, roasting orbits, far closer than Mercury's orbit around the sun. Others swoop close to their stars and then swing far out on egg-shaped paths, scattering smaller bodies as they go. Some newborn planets fling their sibling planets to a fiery doom or into the depths of space.

Nowhere to be seen—at least not yet—is a solar system like ours, with solid planets near the sun and gas-giant planets on orderly processions farther out. Such a system is the likeliest place for a rocky planet like Earth to survive in a stable orbit for billions of years. Perhaps it's parochial, but astronomers seeking signs of life elsewhere in the cosmos—a quest that animates the search for exoplanets—are looking for planets and solar systems rather like ours, with a planet that is neither too far from nor too close to a star, and perhaps with water on its surface. The California team says finding Earth-like planets is just a matter of time.

The study of exoplanets is still very new, after all. Earlier than a decade ago, astronomers figured it would be impossible to see them against the brilliant glare of their stars. So a few astronomers tried to find exoplanets by looking for stars that seemed to wobble, tugged by the gravity of unseen bodies orbiting around them. But most experts doubted the approach would work. "People thought looking for planets was worthless," McCarthy

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ROBERT IRION *directs the Science Communication Program at the University of California at Santa Cruz. Photographer* **PETER MENZEL** *co-authored* Hungry Planet: What the World Eats.

PP. 38-40 PETER MENZEL

says. "It was one step above the search for extraterrestrial intelligence, and that was one step above being abducted by aliens. Now, it's one of the greatest scientific advances of the 20th century."

THE FIRST EXOPLANET, discovered in 1995 by Michel Mayor and Didier Queloz of the University of Geneva, in Switzerland, was a giant object half the size of Jupiter, whirling around a star similar to our sun in a frenzied orbit every four days. The star, in the constellation Pegasus, is about 50 light-years away. More "hot Jupiters," or giant gaseous planets orbiting close to stars, quickly surfaced, if only because those big bodies impose the most pronounced wobbles on their parent stars.

Though astronomers haven't observed those planets directly, they infer that they're gaseous from their sheer size and what's known about planet formation. A planet coalesces out of the debris in the great disks of dust and gas surrounding stars. If it reaches a certain size—10 to 15 times the size of Earth—it exerts such a gravitational pull and sucks in so much gas that it becomes a gas giant.

As measuring techniques improved, astronomers discerned gradually smaller planets—first the size of Saturn, then down to Neptune and Uranus. After a few years of spotting exoplanets, scientists saw a promising trend: as the sizes they could detect got smaller, there were more and more of them. The process that builds planets seems to favor the little ones, not the titans.

In the last year and a half, the California team and a group led by researchers in Paris discovered the smallest exoplanets yet seen around sunlike stars: the two planets were just five to eight times the mass of Earth. Astronomers say such worlds may consist mostly of metal and rock, perhaps with thick atmospheres. The exoplanet found by astronomer Geoff Marcy of the University of California at Berkeley and colleagues is close to its star and probably too hot for liquid to

MARTIN KORNMESSER / THE INTERNATIONAL ASTRONOMICAL UNION

What Makes a Planet?

Why Our Solar System Just Shrank

As just about everyone in the solar system knows by now, members of the International Astronomical Union, meeting in Prague, Czech Republic, in August, came up with a new definition of planets that leaves Pluto out in the cold.

The problem was that the term "planet" had no firm definition, just as in geology, "continent" remains a somewhat arbitrary concept. (Europe and Asia form a continuous landmass, yet they are separate continents.) Size alone doesn't bestow planethood. Moons of Jupiter and Saturn are wider than Mercury, and Pluto is smaller than Earth's moon. For years, astronomers tried to define a planet by shape, orbit around a star and its influence on other bodies. But they couldn't agree.

In 2000, an exhibit at the American Museum of Natural History in New York City downgraded Pluto to merely the largest object in the Kuiper Belt, a vast swarm of icy bodies beyond Neptune. The resulting uproar over the demotion made it clear that Earthlings loved our familiar family of nine planets. Some astronomers noted that the controversy would really take off if more sensitive telescopes started to spot objects larger than Pluto. What would we call them?

That very quandary presented itself late last year when a team led by Michael Brown of the California Institute of Technology in Pasadena examined an object in the Kuiper Belt called 2003 UB313, informally known as Xena. Analysis revealed that Xena—more than twice as far from the sun as Pluto—is about 1,500 miles in diameter, compared with Pluto's 1,430 miles. And solar system experts predict that surveys will reveal Xena's even bigger siblings in distant orbits. "It's absurd that dozens of Pluto-size objects should all be planets," said planet-hunter Geoff Marcy of the University of California at Berkeley. "It demotes them all by sheer numbers."

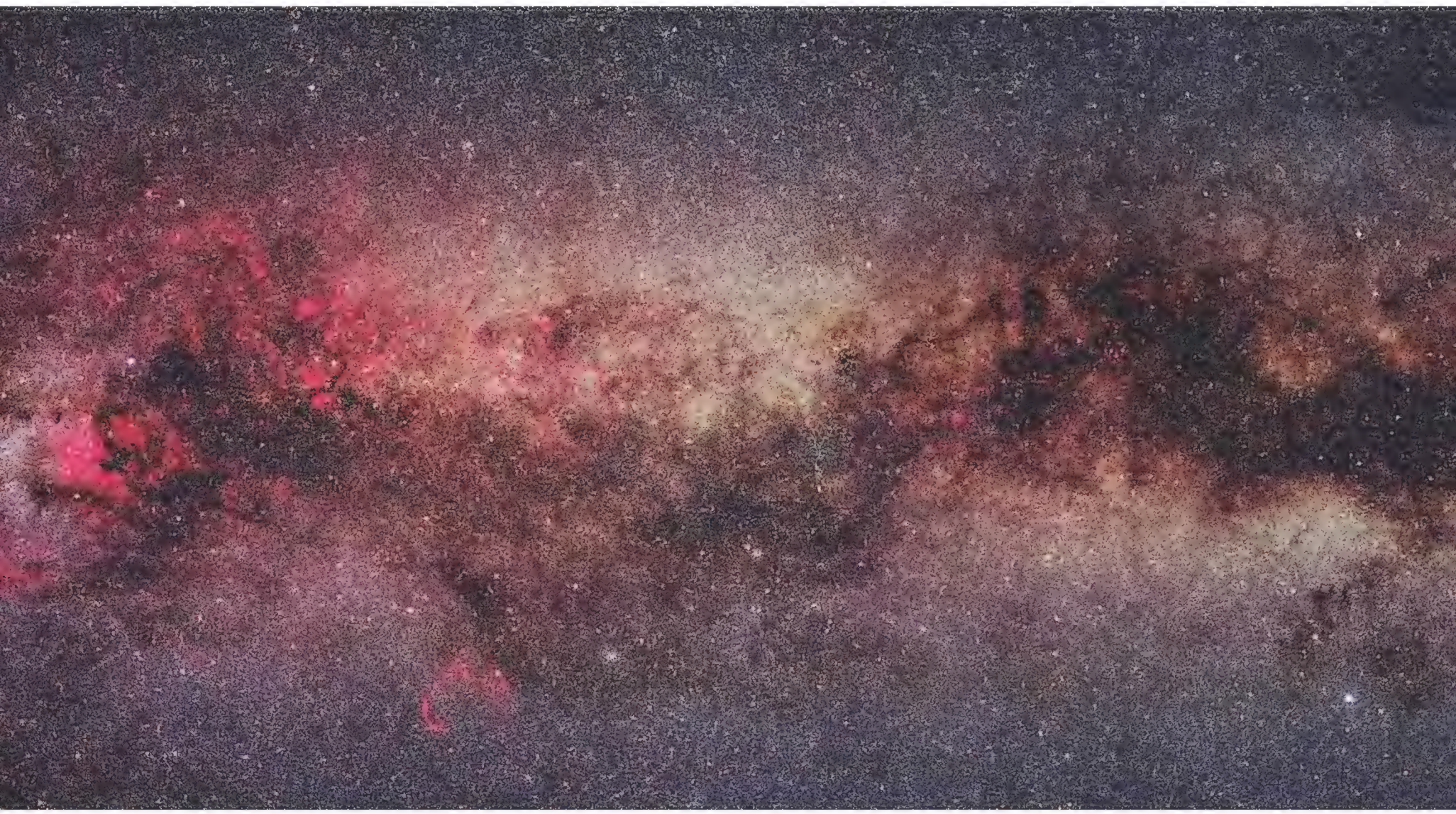
Many astronomers argued that a planet should have sufficient gravity to sweep up or expel the debris in its orbit, clearing its own path around its star. The eight main planets have largely done so, but not Pluto or Xena. Ultimately, that was the key factor in Prague. "It is scientifically the right thing to do," Brown said after the vote, gracefully giving up the right to call Xena—his team's discovery—the tenth planet.

Still, some researchers think the orbit-clearing rule is too fuzzy. (For example, Neptune hasn't purged its orbit of large bodies—including Pluto, which crosses Neptune's path.) "It's a sloppy definition," says Alan Stern of the Southwest Research Institute in Boulder, Colorado, director of NASA's New Horizons mission. "It's bad science. It ain't over." He and others intend to fight for a new definition; they're organizing a conference to that end for this winter.

Pluto will always be special. We'll see it up close when the New Horizons spacecraft, launched in January, flies past it in 2015. But Pluto is almost certainly one of scores or even hundreds of impressively sized icy bodies in the Kuiper Belt. So, like Xena and Ceres, the largest asteroid in a band between Mars and Jupiter, it is now classified as a "dwarf planet." It's cruel logic, perhaps, but it makes sense. —R.I.

exist on its surface. The other planet orbits far from a faint star and may be as cold as Pluto. Still, learning that not all exoplanets are giant balls of gas was a landmark for the field. "These are the first plausibly rocky worlds," says Marcy. "For the first time, we are beginning to discover our planetary kin among the stars."

The most surprising feature of exoplanets so far, Marcy says one day in his office on the Berkeley campus, is their unusual orbits. In the classic "overhead view" diagram of our solar system, the planets (except for oddball Pluto, recently demoted to a dwarf planet; see sidebar) trace nifty concentric circles around the sun. Marcy reaches behind his neat desk and takes out an orrery, a mechanical model of our solar system. Metal balls at the ends of spindly arms swivel around the sun. "We all expected to see these phonograph-groove circular orbits," Marcy says. "That's what the textbooks said about planetary systems. So when we first started seeing eccentric orbits in 1996, people said they can't be planets. But they turned out to be a harbinger of things to come."



Though the exoplanets found to date are in our galaxy (the Milky Way, above), most are about 100 light-years away.

JUST AFTER MIDNIGHT at the Lick Observatory, the astronomers are making good progress on the night's checklist of 40 stars. Their targets usually aren't the major stars of the constellations, but, even so, many are bright enough to see with the naked eye. "When I'm out with my friends, I can point to a couple of stars that we know have planets," Howard Isaacson says. One particularly bright star in the Andromeda constellation has three.

McCarthy offers to reveal the secret of the team's success at spying exoplanets. We walk into the dark dome and pass under the telescope, with its ten-foot-wide mirror that collects and focuses the faint rays of light from distant stars. I had seen the massive telescope during daytime tours, but at night it looks much more vital, its thick metal struts angled like the legs of a tall praying mantis looking up at the heavens. McCarthy leads me to a cramped room beneath the dome's floor, where starlight concentrated by the telescope's mirror is streaming into a cylinder smaller than a soda can. It's wrapped in blue foam, with glass on both ends. It looks empty inside, but I'm told it's full of iodine gas heated to 122 degrees Fahrenheit.

This iodine cell was developed by Marcy and his former student Paul Butler, now an astronomer at the Carnegie Institution in Washington, D.C. When light from a star passes through the hot gas, iodine molecules absorb certain wavelengths of light. The remaining light is spread out into a rainbow by an instrument that acts like a prism. Because the iodine has subtracted bits of light, dark lines are scattered across the spectrum like a long supermarket bar code. Each star carries its own signature of wavelengths of light that have been absorbed by the star's atmosphere. These wavelengths shift slightly when a star moves toward or away

JOHN P. GLEASON

from us. The astronomers compare the star's own signature of dark lines with the stable iodine lines from one night to the next, and from month to month and year to year. Because there are so many fine lines, it's possible to detect even minute shifts. "It's like holding the star up to a piece of graph paper," McCarthy says. "The iodine lines never move. So if the star moves, we use the iodine lines as a ruler against which to measure that motion."

For something as big as a star, the only things that can cause a regular, repeating shift are the gravitational tugs of another star—which astronomers could detect easily because of a companion star's own light signature and its hefty mass—or a hidden planet orbiting around it. The iodine cell can track a star moving as slowly as several feet per second—human walking speed—across the vast emptiness of trillions of miles of space. This sensitivity is why many planet-hunting teams use the iodine cell.

I peer inside it and see some crinkled foil and heating wires snaking through the blue foam. Strips of duct tape appear to hold parts of it together. After we return to the control room, McCarthy chuckles and points out the slogan on Keith Baker's sweat shirt: "When the going gets tough, the tough use duct tape."

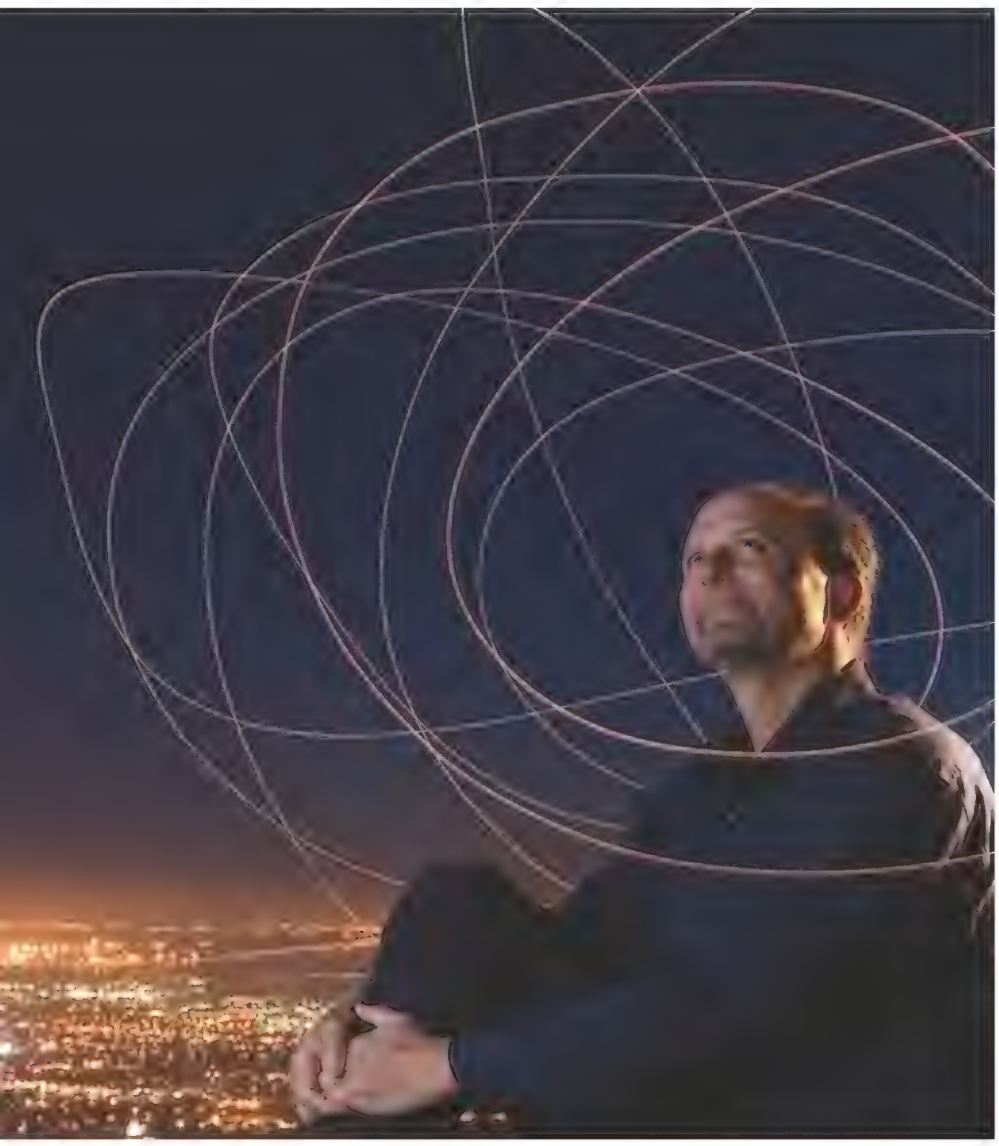
THE MORE ODDLY SHAPED and oddly spaced orbits that astronomers find, the more they realize that the natural process of planet formation invites chaos and disorder. "It became clear that our solar system, with its beautiful dynamics and architecture, was much more stable than those around other stars," says theoretical astrophysicist Greg Laughlin of the University of California at Santa Cruz, who collaborates with Marcy and Butler's team. Trying to figure out how new planets acquired their weird paths has been a daunting task. Laughlin designs computer models of exoplanet orbits to try to re-create the planets' histories and predict their fates. He focuses on the role of gravity in wreaking havoc. For instance, when a big planet moves on an eccentric orbit, its gravity can act like a slingshot and fling smaller nearby worlds. "In some of these systems," Laughlin says, "if you insert an Earth-like planet in a habitable orbit, it can literally be ejected within weeks."

Interactions among planets may be common in the cosmos, Laughlin and his colleagues say. Almost 20 stars are known to have more than one planet orbiting around them, and some of these sibling exoplanets are locked into a dance called a "resonance." For instance, one planet circling a star called Gliese 876 takes 30 days to orbit, while another planet takes almost exactly twice as long. Laughlin's calculations show that their mutual gravitational pull preserves a stable, clocklike arrangement between the two planets.

Resonances are strong clues that the planets migrated far from their birthplaces. The disk of dust and gas that spawns embryonic planets has a gravity of its own. The disk drags on the planets, gradually pulling them inward toward the star or, in some cases, forcing them outward. As this migration goes on for hundreds of thousands of years, some

exoplanets become trapped in resonances with their neighbors. When big planets end up in close quarters, they whip each other around and create some of the eccentric orbits seen by the team. At least, that's the current best guess.

Other planets are not long for this world. Laughlin's computer models suggest that some of the planets closest to their stars will plunge into them as more distant planets bully their way into smaller orbits, perhaps in a matter of hundreds of thousands of years. This research into distant solar systems has raised a fascinating scenario about our own solar system. Some astronomers theorize that Venus, Earth and Mars are "second-generation" planets, successors to earlier bodies that were born closer to the sun and migrated inward until they were consumed.



Is it likely that our galaxy is home to another hospitable planet like Earth? Many astronomers (Geoff Marcy) say yes.

Does all the observed chaos in the universe portend dire consequences for small rocky planets? Not at all, Laughlin says. The technique of measuring the back-and-forth wobbles of stars, sensitive as it is, would have to be about ten times finer to reveal objects the size of Earth. But satellite telescopes scheduled for launch in the next few years might be able to detect "shadows" of alien earths as the small planets pass in front of their stars. Laughlin predicts the satellites will find such bodies in droves, even around stars where no large planets have yet been seen. "It's very likely that [sun-like] stars are accompanied by terrestrial planets," he says. "My intuitive sense is that our solar system is not uncommon at all."

Berkeley's Geoff Marcy agrees, because he says every star is born with enough raw material around it to create many planets. Lots of solid planets like Earth should form, he says, as dust coalesces into pebbles, which collide again and again to make asteroids and moons and planets. "Maybe Jupiters are rare," he says, "but rocky planets almost certainly are common. I just don't see how making an Earth could be hard."

The small exoplanet recently detected by Marcy and Butler's team supports that view. They found it while monitoring the two resonant planets in the Gliese 876 system, which is 15 light-years away. Something was exerting subtle extra tugs on the planets' orbits, and the best explanation for that is a third planet perhaps 7.5 times as massive as Earth. Given its size, the planet is likely rocky, like Earth, rather than a gas giant. The discovery was a major step toward answering the question on everyone's mind: Can we find potential habitats for life elsewhere?

Astronomers were hoping that question would be answered by a NASA satellite mission called Terrestrial Planet Finder. It was supposed to go beyond detecting exoplanets: it would take images of the most tantalizing exoplanets and analyze their atmospheres. But early this year, NASA put the mission on hold, largely because of budget overruns from the space station and the space shuttle and the expected cost of the plan to send people to Mars.

In the meantime, the California-based team keeps looking for more exoplanets. In a few months, Marcy and coworker Debra Fischer of SFSU will start working with a new telescope at Lick called the Automated Planet Finder that will feature the most sensitive light-analyzing instrument yet made for exoplanet searches. The robotic instrument will scan about 25 promising stars every clear night, with the potential to detect planets as small as three to five times bigger than Earth. "This will be the world's first telescope completely dedicated to planet hunting," Fischer says. "People thought it would take billion-dollar space missions to find other planets like Earth, but I think we have a shot at it from the ground."

Marcy says finding planets from earth is just the beginning. "Ultimately, we need to go, with robotic spacecraft and a small digital camera, and send that little puppy to Tau Ceti or Epsilon Eridani," Marcy says, naming two nearby stars with particular promise for hosting Earth-like planets. They are 12 and 10.5 light-years away, respectively. "Sure it will take 100 years [to develop the technology], but it is a wonderful goal for our species, and it is within our grasp. It is entirely technologically feasible to get the first pictures of the surface of a planet around another star. We can launch a global mission, an emissary from Earth. The effort we're doing now is simply reconnaissance for that mission, but it is a glorious reconnaissance to spot the first oases in the cosmic desert."

Visit Smithsonian.com for animations of exoplanet orbits.

PETER MENZEL

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Return TO THE Marsh

The effort to restore the Marsh Arabs' traditional way of life in southern Iraq—virtually eradicated by Saddam Hussein—faces new threats

BY JOSHUA HAMMER

PHOTOGRAPHS BY PETER VAN AGTMAEL

THE BRITISH ROYAL AIR FORCE helicopter sweeps low over a sea of marsh grass, then banks sharply to the left, hurling me off my seat and onto the chopper's rough metal floor. Fifty feet below, pools of silver water speckled with rust-colored flora and lush reed islands in cookie-cutter shapes extend in every direction. Women swathed in black veils and black robes called abayas punt long boats past water buffalo lolling in the mud. Sparkles of light dance off a lagoon, and snowy herons glide over the wetlands.

I'm traveling with a unit of British soldiers deep into Al Hammar Marsh, a 1,100-square-mile freshwater sea located between the southern Iraqi cities of An Nasiriyah and Basra, the country's second largest after Baghdad. Saddam Hussein's engineers and soldiers turned it into a desert after the Persian Gulf war of 1991, but during the past three years—thanks to a dismantling of dikes and dams built on Saddam's orders in the early 1990s—the marshlands have been partially rejuvenated. Now this fragile success is facing new onslaughts—from economic deprivations to deadly clashes among rival Shiite militias.

The Merlin chopper touches down in a muddy field beside a cluster of mud-brick and reed houses. A young Romanian military officer with a white balaclava around his head rushes up to greet us. He's part of a "force protection" group dispatched from An Nasiriyah in armored personnel carriers to make sure that this British reconnaissance team—scouting villages for an upcoming World Environment Day media tour—gets a warm reception from the local population. As we climb out of the muck and onto a dirt road, the Merlin flies off to a nearby military base, leaving us in a silence I've never before experienced in Iraq. A few moments later, two dozen Iraqi men and boys from a nearby village, all dressed in *dishdashas*—gray traditional robes—crowd around us. The first words out of their mouths are requests for *mai*, water. As Kelly Goodall, the British Army's interpreter, hands out bottles of water, a young man shows me a rash on his neck and asks if I have anything for it. "It comes from drinking the water in the marshes," he tells me. "It isn't clean."

The villagers tell us they haven't seen a helicopter since the spring of 1991. That was when Saddam sent his gunships into the wetlands to hunt down Shiite rebels and to strafe and bomb the Marsh Arabs who had supported

The Al Hammar Marsh is a 1,100-square-mile freshwater sea between the southern Iraqi cities of An Nasiriyah and Basra. Although Saddam Hussein turned the area into a desert after the 1991 Persian Gulf war, the marshlands have seen some restoration since Saddam's overthrow. "Life is difficult now," says a village chief, "but at least we have our marshes back."

Some displaced Marsh Arabs (a village near Basra) want more water diverted to the area to expand their homeland, but others reject traditional ways. "We will have to accept that the Marsh Arabs want to live with modern facilities and do business," says a Danish adviser to the Iraqi government.

them. "We came back from An Nasiriyah and Basra after the fall of Saddam, because people said it was better to go back to the marshes," the village chief, Khathem Hashim Habib, says now. A hollow-cheeked chain smoker, Habib claims to be only 31 years old, but he looks 50, at least. Three years after the village reconstituted itself, he says, there are still no paved roads, no electricity, no schools and no medicine. Mosquitoes swarm at night, and nobody has come to spray with insecticide. The nearest market for selling fish and water-buffalo cheese, the economic mainstays, is an hour away by truck; during the rainy months, the Euphrates River rises, washing out the road, swamping the village and marooning everyone in the muck.

"We want help from the government," Habib says, leading us down the road to his home—four sheets of tightly woven reeds stretched over a metal frame. "The officials in Basra and Nasiriyah know that we're here, but help isn't coming," he tells a British officer.

"We're here to see exactly what needs to be done," the officer, fidgeting, assures the chief. "We'll work with the Basra provincial council, and we'll make some improvements."

Habib doesn't appear convinced. "We haven't seen anything yet," he calls after the troops as they head down the road to await the Merlin's return. "So far it's been just words." As the British hustle me along, I ask Habib if he would prefer going back to live in the cities. He shakes his head no, and his fellow villagers join in. "Life is difficult now," he tells me, "but at least we have our marshes back."

A COMPLEX ECOSYSTEM created by the annual flooding of the Euphrates and Tigris rivers, Iraq's marshes have sustained human civilization for more than 5,000 years. Some of the earliest settlements of Mesopotamia—"the land between the rivers"—were built on floating reed islands in these very wetlands. This was one of the first places where human beings developed agriculture, invented writing and worshiped a pantheon of deities. In more recent times, the remoteness of

PHOTOGRAPH: PETER VAN AGTMAEL / POLARIS IMAGES; MAP: MIKE REAGAN

the region, the near-absence of roads, the difficult terrain and the indifference of Baghdad's governing authorities insulated the area from the political and military upheavals that buffeted much of the Arab world. In his 1964 classic, *The Marsh Arabs*, British travel writer Wilfred Thesiger described a timeless environment of "stars reflected in dark water, the croaking of frogs, canoes coming home at evening, peace and continuity, the stillness of a world that never knew an engine."

Saddam Hussein changed all that. Construction projects and oilfield development in the 1980s drained much of the wetlands; the Iran-Iraq War (1980-88) forced people to flee from border areas to escape mortar and artillery attacks. By 1990 the population had fallen from 400,000 to 250,000. Then came the gulf war. After the U.S.-led coalition routed Saddam's army in March 1991, President George H.W. Bush encouraged the Kurds and Shiites to rebel against Saddam, then, when they did so, declined to support them. Saddam reconstituted his revolutionary guard, sent in helicopter gunships and slaughtered tens of thousands. Shiite rebels fled to the marshes, where they were pursued by tanks and helicopters. Iraqi ground troops torched villages, set fire to reed beds and killed livestock, destroying most of the region's economic viability.

In 1992, Saddam began the most insidious phase of his anti-Shiite pogroms. Workers from Fallujah, Tikrit and other Baathist strongholds were transported to the south to construct canals, dams and dikes that blocked the flow of rivers into the marshes. As the wetlands dried up, an estimated 140,000 Marsh Arabs were driven from their homes and forced to resettle in squalid camps. In 1995, the United Nations cited "indisputable evidence of widespread destruction and human suffering," while a report by the United Nations Environmental Program in the late 1990s declared that 90 percent of the marshes had been lost in "one of the world's greatest environmental disasters."

After the overthrow of Saddam in April 2003, local people began breaching the dikes and dams and blocking the canals that had drained the wetlands. Ole Stokholm Jepsen, a Danish agronomist and senior adviser to the Iraqi Minister of Agriculture, says that "recovery has happened far faster than we ever imagined"; at least half of the roughly 4,700 square miles of wetland has been reflooded. But that's not the end of the story. Fed by the annual snowmelt in the mountains of Anatolia, Turkey, the marshes were once among the world's most biologically diverse, supporting hundreds of varieties of fish, birds, mammals and plant life, including the ubiquitous *Phragmites australis*, or ordinary marsh reed, which locals use to make everything from houses to fishing nets. But Saddam's depredations, combined with ongoing dam projects in Turkey, Syria and northern Iraq, have interfered with the natural "pulsing" of floodwaters, complicating restorative processes. "Nature is healing itself," said Azzam Alwash, a Marsh Arab who immigrated to the United States, returned to Iraq in 2003 and runs the environmental group Nature Iraq, based in Baghdad. "But many forces are still working against it."

IAN JONES / AP PHOTO

Drinking water is a precious commodity in southern Iraq (a Marsh Arab girl in Enghabashir, west of Basra). Often, the first thing a visitor to the region hears is a request for *mai*, water. One boy displays a rash on his neck. "It comes from drinking the water in the marshes," he says. "It isn't clean."

I FIRST VISITED the marshes on a clear February day in 2004. From Baghdad I followed a stretch of the mighty, 1,100-mile-long Tigris River southeast to the predominantly Shiite town of Al Kut, near the Iran border. At Al Kut, I headed southwest away from the Tigris through the desert to An Nasiriyah, which straddles the banks of the 1,730-mile-long Euphrates. The ziggurat of Ur, a massive stepped pyramid erected by a Sumerian king in the 21st century B.C., lies just a few miles west of An Nasiriyah. To the east, the Euphrates enters the Al Hammar Marsh, reappearing north of Basra, where it joins the Tigris. The Bible suggests that Adam and Eve's Garden of Eden lay at the confluence of the two rivers. Today the spot is marked by a dusty asphalt park, a shrine to Abraham, and a few scraggly date palm trees.

I was joined in An Nasiriyah, a destitute city of 360,000 and the site of one of the bloodiest battles of the ongoing war, by a former Shiite guerrilla who uses the name Abu

JOSHUA HAMMER's Yokohama Burning *was published in September.* **PETER VAN AGTMAEL**'s *Web site is v8xphoto.com.*

A complex ecosystem created by the annual flooding of the Tigris and Euphrates rivers, Iraq's southern marshes (near An Nasiriyah, 1974) have sustained human civilization for 5,000 years. In 1964, travel writer Wilfred Thesiger rhapsodized about "the stillness of a world that never knew an engine."

Saddam's retributions after the 1991 gulf war, combined with ongoing dam projects in Turkey, have interfered with the natural "pulsing" of the river floodwaters (near Basra). Some environmentalists call for the construction of movable gates that would mimic the flooding of the Tigris and Euphrates.

Mohammed. A handsome, broad-shouldered man with a gray-flecked beard, Abu Mohammed fled An Nasiriyah in 1991 and spent five years hiding in the marshes following the rebels' defeat. In mid-1996, he and a small cell of Shiite conspirators plotted the assassination of Uday Hussein, Saddam's psychopathic son. Four of Abu Mohammed's comrades gunned down Uday—and left him paralyzed—on a Baghdad street that December. Saddam's Republican Guards pursued the conspirators through the marshes, burning rushes and reeds, knocking down eucalyptus forests and bulldozing and torching the huts of any local villagers who provided shelter to the rebels. Abu Mohammed and his comrades fled across the border to Iran. They didn't begin filtering back to Iraq until U.S. forces routed Saddam in April 2003.

After half an hour's drive east out of An Nasiriyah, through a bleak, pancake-flat landscape of stagnant water, seas of mud, dull-brown cinder-block houses, and minarets, we came to Gurmat Bani Saeed, a ramshackle village at the edge of the marshes. It is here that the Euphrates River divides into the Al Hammar Marsh, and it was here that Saddam Hussein carried out his ambition to destroy Marsh Arab life. His 100-mile-long canal, called the Mother of All Battles River, cut off the Euphrates and deprived the marshes of their prime water source. After its completion in 1993, "not a single drop of water was allowed to go into Al Hammar," Azzam Alwash would later tell me. "The entire marsh became a wasteland."

In April 2003, Ali Shaheen, director of An Nasiriyah's irrigation department since the late 1990s, cranked open three metal gates and dismantled an earthen dike that diverted the Euphrates into the canal. Water washed across the arid flats, reflooding dozens of square miles in a few days. Almost simultaneously, local people 15 miles north of Basra tore down dikes along a canal at the south end of the marsh, allowing water to flow from the Shatt-al-Arab, the waterway at the entrance to the Persian Gulf. In all, more than 100 dams and embankments were destroyed in those first exhilarating days when everything seemed possible.

Abu Mohammed led me down narrow causeways that ran past newly formed seas dappled by mud flats and clumps of golden reeds. Choruses of frogs warbled from lily pad clusters. "This used to be a dry part of the marsh," he said. "We used to walk over it, but you see it is filling up." The returning Marsh Arabs had even formed a rudimentary security force: rugged-looking men armed with Kalashnikovs, who were both protecting visitors and trying to enforce *fatwas* issued by the Grand Ayatollah Ali Al Sistani, the preeminent religious leader of Iraq's Shiite Muslims. With coalition troops stretched thin and no effective police or judicial system in place, the local guardsmen served as the only law and order in the region. One patrol was combing the marshes for fishermen who vio-

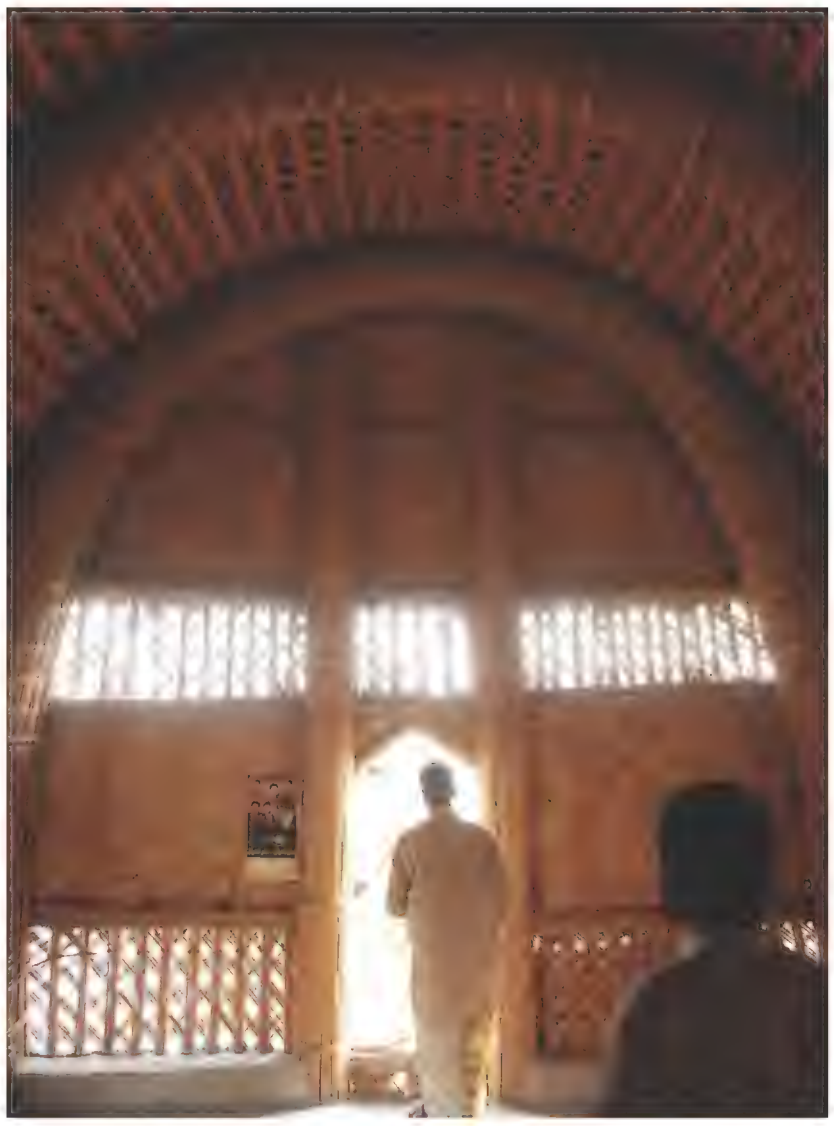
PP. 50, 51 NIK WHEELER / CORBIS

lated Sistani's prohibition against "electroshock fishing": using cables connected to a car battery to electrocute all the fish in a three-foot radius. The prohibited method was threatening the marsh's resuscitation just as it was getting under way.

WHEN I RETURNED to the marshes in May 2006, southern Iraq, like the rest of the country, had become a far more dangerous place. An epidemic of kidnappings and ambush killings of Westerners had made travel on Iraq's roads highly risky. When I first announced that I hoped to visit the marshes without military protection, as I had done in February 2004, both Iraqis and coalition soldiers looked at me as if I were crazy. "All it takes is one wrong person to find out that an American is staying unprotected in the marshes," one Shiite friend told me. "And you may not come out."

So I hooked up with the 51 Squadron RAF Regiment, a parachute- and infantry-trained unit that provides security for Basra's International Airport. When I arrived at their headquarters at nine o'clock on a May morning, the temperature was already pushing 100 degrees, and two dozen soldiers—wearing shoulder patches displaying a black panther, a Saracen sword and the regimental motto, "Swift to Defend"—were working up a sweat packing their armored Land Rovers with bottled water. Flight Lt. Nick Beazly, the patrol commander, told me that attacks on the British in Basra had increased the past six months to "once or twice a week, sometimes with a volley of five rockets." Just the evening before, Jaish al-Mahdi militiamen loyal to renegade Shiite cleric Muqtada al-Sadr, had blown up an armored Land Rover with a wire-detonated artillery round, killing two British soldiers on a bridge on Basra's northern outskirts. Kelly Goodall, the British interpreter who had joined me several days earlier on the helicopter trip to the marshes, had been called away at the last minute to deal with the attack. Her absence left the team with nobody to translate for them—or me. Every last local translator, I was told, had resigned during the past two months after getting death threats from Jaish al-Mahdi.

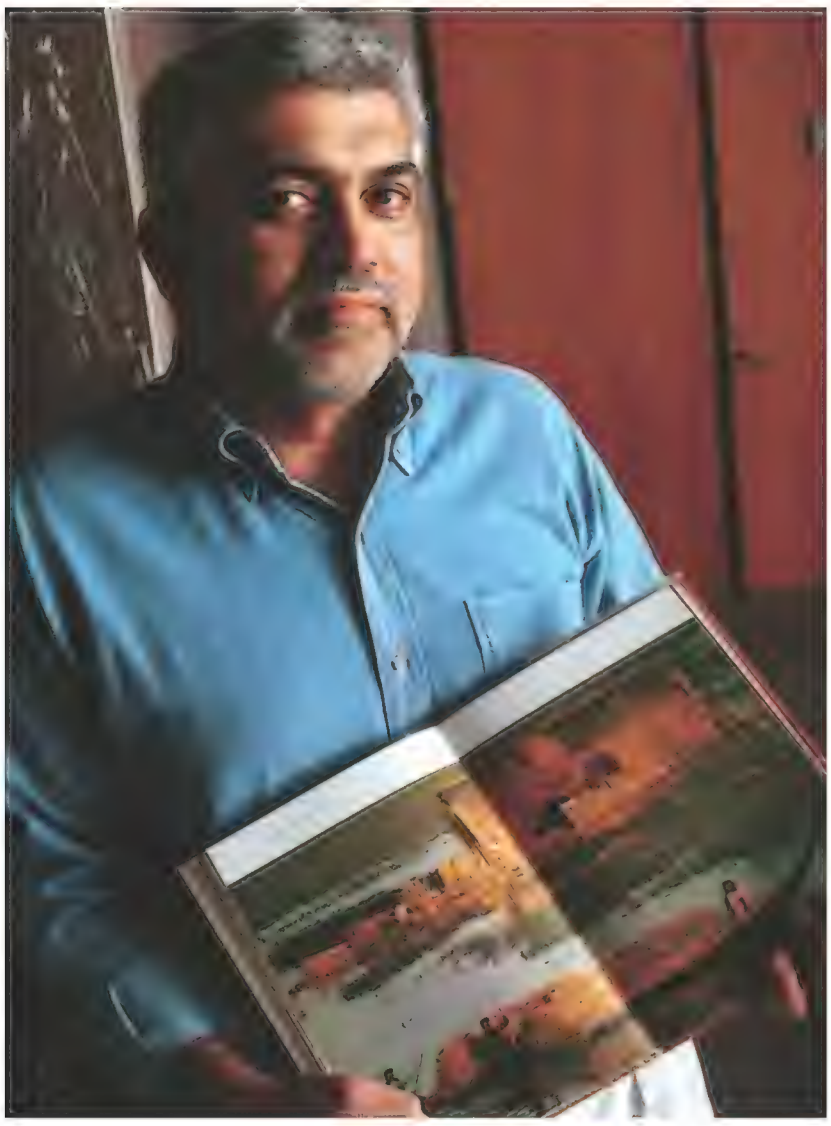
We stopped beside a wire-mesh fence that marks the end of the airfield and the beginning of hostile territory. Grim-faced soldiers locked and loaded their weapons. At a bridge over the Shatt al-Basra Canal, the troops dismounted and checked the span and surrounding area for booby traps. Then, just over a rise, the marshes began. Long boats lay moored in the shallows, and water buffalo stood half hidden in the reeds. As we bounced down a dirt road that bordered the vast green sea, the soldiers relaxed; some removed their helmets and put on cooler light blue berets, as they are sometimes allowed to do in relatively safe areas. After a 30-minute drive, we reached Al Huwitha, a collection of mud-and-concrete-block houses strung along the road; a few homes had satellite dishes on their corrugated tin roofs. Children poured out of the houses, greeting us with thumbs up and cries of "OK." (The British battle for hearts and minds has actually paid off in Al Huwitha: after the reflooding, troops dumped thousands of tons of earth on waterlogged terrain to raise land levels for housing construction in certain spots, then improved electrification and water purification. "We're happy with the British," said one local man. "We have no problems with them, *hamdilullah* [thanks to God].")



A 30-foot-high communal meetinghouse, or *mudheef*, is constructed entirely of the region's ubiquitous marsh reeds, which, woven into majestic arches, support even its elegantly curved roof. "If you go back 4,000 years," one villager told the author, "you'll find exactly the same design."

In the center of Al Huwitha rose a large *mudheef*, a 30-foot-high communal meetinghouse made entirely of reeds, with an elegant curving roof. Some local men invited me inside—I was able to talk to them in rudimentary Arabic—and I gazed at the interior, which consisted of a series of a dozen evenly spaced, cathedral-like arches, tightly woven from reeds, supporting a curved roof. Oriental carpets blanketed the floor, and at the far end, glowing in the soft natural light that seeped in through a doorway, I could make out richly colorful portraits of Imam Ali, son-in-law of the prophet Muhammad, and his son, Imam Hussein, the two martyred saints of Shiite Islam. "We built the mudheef in 2003, following the old style," one of the men told me. "If you go back 4,000 years, you will find exactly the same design."

Al Huwitha's biggest problem stems from an unre-



"The timing of the flooding is vital to the health of the marshes," says Azzam Alwash, a Marsh Arab who now runs an environmental group called Nature Iraq. "You need fresh water flowing in when the fishes are spawning, the birds are migrating, the reeds are coming out of their winter dormancy."

solved tribal feud that goes back 15 years. The people of the village belong to a tribe that sheltered and fed the Shiite rebels just after the gulf war. In the summer of 1991, some 2,500 members of a rival tribe from Basra and wetlands to the north showed Saddam's Republican Guards where the Al Huwitha men were hiding. The Guards killed many of them, a British intelligence officer told me, and there's been bad blood between the two groups ever since. "Al Huwitha's men can't even move down the road toward Basra for fear of the enemy group," the officer went on. "Their women and children are allowed to pass to sell fish, buffalo cheese, and milk in Basra markets. But the men have been stuck in their village for years." In 2005, a furious battle between the two tribes erupted over a love affair—"a Romeo and Juliet story," the officer added. The fighting lasted for days, with both sides firing rocket-propelled grenades, mortars and heavy machine guns at each other. The officer asked the sheik of Al Huwitha "if there was any chance of a truce, and he said, 'This truce will happen only when one side or the other side is dead.'"

The violence among Shiite groups in and around Basra has escalated sharply in recent months. In June Iraqi prime minister Nouri al-Maliki declared a state of emergency and sent several thousand troops to the area to restore order. In August supporters of an assassinated Shiite tribal leader lobbed mortar rounds at bridges and laid siege to the governor's office to demand that he arrest their leader's killers.

DRIVING BACK TOWARD BASRA, we passed a settlement being built on a patch of wasteland within sight of the airport's control tower. The settlers, Marsh Arabs all, had abandoned their wetlands homes two months earlier and were constructing squat, ugly houses out of concrete blocks and corrugated tin. According to my British escorts, the part of the marshes where they had lived is owned by *sayeds*, descendants of the prophet Muhammad, who forbade them from building "permanent structures," only traditional reed houses. This was unacceptable, and several hundred Marsh Arabs had picked up and moved to this bone-dry patch. It is a sign of the times: despite reconstruction of a few mudheefs, and some Marsh Arabs who say they would like to return to the old ways, the halcyon portrait of Marsh Arab life drawn by Wilfred Thesiger half a century ago has probably disappeared forever. The British officer told me he had asked the settlers why they didn't want to live in reed huts and live off the land. "They all say they don't want it," the officer said. "They want sophistication. They want to join the world." Ole Stokholm Jepsen, the Danish agronomist advising the Iraqis, agreed. "We will have to accept that the Marsh Arabs want to live with modern facilities and do business. This is the reality."

Another reality is that the marshes will almost certainly never recover completely. In earlier times, the Tigris and Euphrates, overflowing with snowmelt from the Turkish mountains, spilled over their banks with seasonal regularity. The floods flushed out the brackish water and rejuvenated the environment. "The timing of the flooding is vital to the health of the marshes," says Azzam Alwash. "You need fresh water flowing in when the fishes are spawning, the birds are migrating, the reeds are coming out of their winter dormancy. It creates a symphony of biodiversity."

But these days, the symphony has dwindled to a few discordant notes. Over the past two decades, Turkey has constructed 22 dams and 19 hydroelectric power plants on the Euphrates and Tigris and their tributaries, siphoning off water before it ever crosses Iraq's northern border. Before 1990, Iraq got more than three trillion cubic feet of water a year; today it's less than two trillion. The Central and Hammar marshes, which are dependent upon the heavily dammed Euphrates, get only 350 billion cubic feet—down from 1.4 trillion a generation ago. As a result, only 9 percent of Al Hammar and 18 percent of the Central Marsh have been replenished, says Samira Abed, secretary general of the Center for Restoration of the Iraqi Marshes, a division of Iraq's Water Resources Ministry. "They are both still in a very poor state." (The Al Hawizeh Marsh, which extends to Iran and receives its water from the Tigris, has recovered 90 percent of its pre-1980 area.)

JONATHAN ALCONN / ZUMA / CORBIS

{ CONTINUED ON PAGE 55 }

In Al Huwitha, British soldiers dumped thousands of tons of earth on waterlogged terrain to allow housing construction, then improved electrification and water purification. "We're happy with the British," said one villager. "We have no problems with them, *hamdilullah* [thanks to God]."

Linda Allen, an American who serves as senior consultant to the Iraqi Ministry of Water, told me that getting more water from Turkey is essential, but despite "keen interest among Iraqis" to strike a deal, "there is no formal agreement about the allocation and use of the Tigris and Euphrates." Iraq and Turkey stopped meeting in 1992. They met once earlier this year, but meanwhile the Turks are building more upstream dams.

Azzam Alwash believes that intransigence on both sides dooms any negotiations. His group, Nature Iraq, is promoting an alternative that, he claims, could restore the marshes to something like full health with three billion cubic meters of additional water per year. The group calls for constructing movable gates on Euphrates and Tigris tributaries to create an "artificial pulse" of floodwater. In late winter, when Iraq's reservoirs are allowed to flow into the Persian Gulf in anticipation of the annual snowmelt, gates at the far end of the Central and Al Hammar marshes would slam shut, trapping the water and rejuvenating a wide area. After two months, the gates would reopen. Though the plan would not exactly replicate the natural ebb and flow of floodwaters of a generation ago, "if we manage it well," Alwash says, "we can recover 75 percent of the marshes." He says that the Iraqi government will need between $75 million and $100 million to build the gates. "We can do this," he adds. "Bringing back the marshes is hugely symbolic, and the Iraqis recognize that."

For the moment, however, Alwash and other marshlands environmentalists are setting their sights lower. In the past three years, Nature Iraq has spent $12 million in Italian and Canadian government funds to monitor salinity levels of marsh water and to compare "robust recovery" areas with those in which fish and vegetation have not thrived. Jepsen, working with the Iraqi Agriculture Ministry, is running fisheries, water-buffalo breeding programs and water-purification schemes: both agriculture and water quality, he says, have improved since Saddam fell. In addition, he says, the "maximum temperatures during the summer have been significantly reduced" across Basra Province.

Sitting in his office in Saddam's former Basra palace, Jepsen recalls his first year—2003—in Iraq wistfully. In those days, he says, he could climb into his four-by-four and venture deep into the marshes with only an interpreter, observing the recovery without fear. "During the last six months, the work has grown extremely difficult," he says. "I travel only with the military or a personal security detail. I am not here to run a risk on my life." He says discontent among the Marsh Arabs is also rising: "In the days after reflooding, they were so happy. But that euphoria has worn off. They are demanding improvements in their lives; the government will have to meet that challenge."

In the marshlands, as in so much of this tortured, violent country, liberation proved to be the easy part.

Visit Smithsonian.com for more pictures and information.

Crick

The game is both very British and, to Americans, very confusing. But it was once our national pastime, and it's gaining fans on these shores

BY SIMON WORRALL
PHOTOGRAPHS BY GREG FOSTER

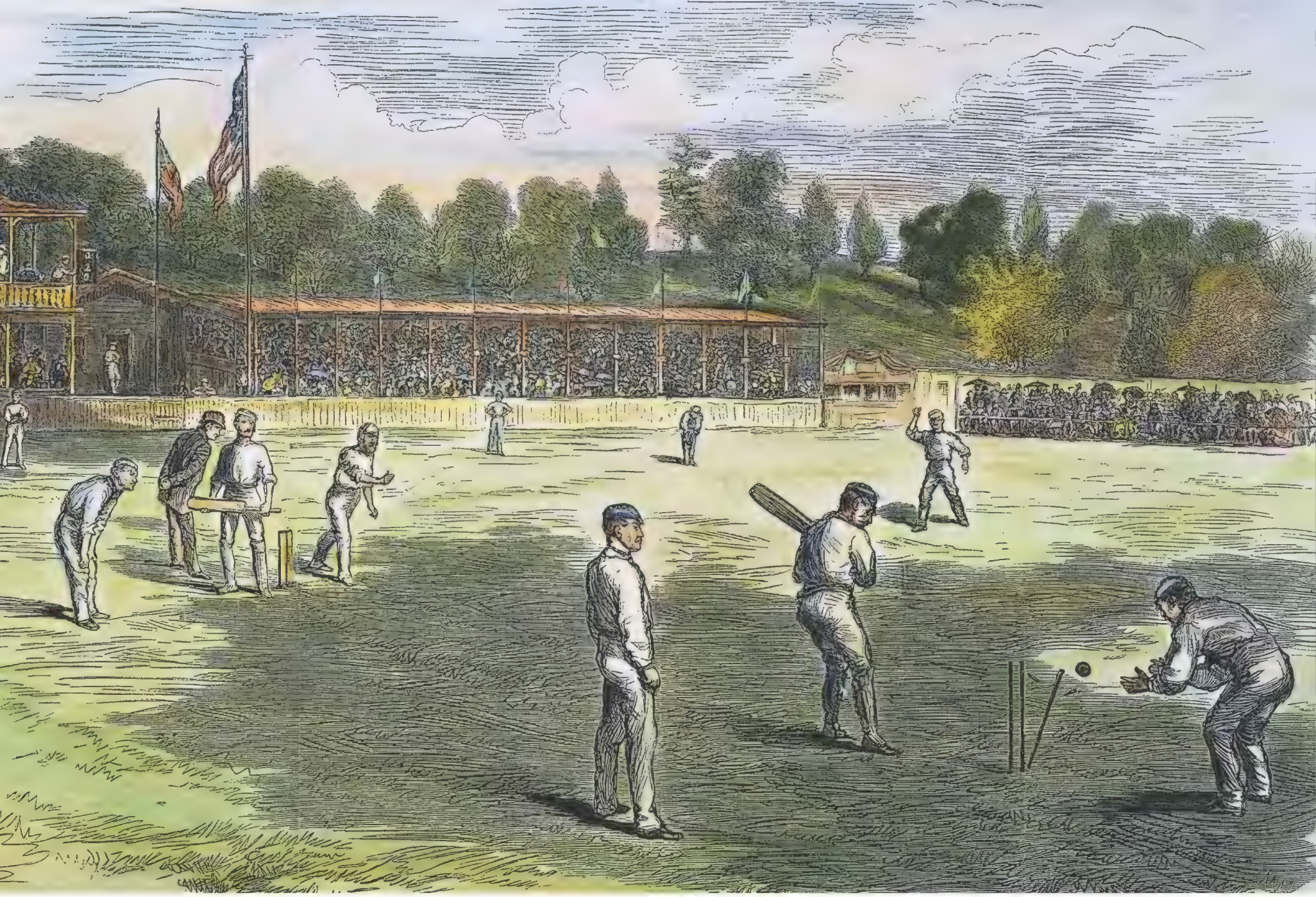
"Good shot, Mouse!" comes a voice from a small crowd of spectators under an awning at the edge of a softball field in suburban Atlanta. It's a semifinal playoff between the Tropical Sports Club and North Atlanta on a hot afternoon in early October, and a Tropical player has just lofted a ball over the fence. But this is a match, not a game; the player is a batsman, not a batter, and a ball whacked over a fence is a "six," not a home run. This may be a softball diamond, but the action on the field—sorry, the pitch—is cricket.

At one end of the awning, a large West Indian woman is barbecuing jerk chicken in an oil drum. There's spicy fish soup and Red Stripe beer. Reggae booms out of the back of a van. Between "balls"—pitches, in baseball—the men talk politics and reminisce about life back on the island of Jamaica.

"Yes, Mouse!" the crowd roars again, as the same batsman sends another ball skyward. For a moment, the ball hangs motionless against the blue sky, before landing with a thump on the awning above the barbecue, just missing the jerk chicken lady. "Stop trying to put out the fire, man!" she bellows to the players as the crowd erupts in laughter.

About 30,000 people play or watch cricket in the U.S. each year, in cities from Philadelphia to Los Angeles to Atlanta. (Right, Salim Khaja of North Atlanta bowls to Chris Harris of the Tropical Sports Club.) Immigrants from India, Pakistan and the Caribbean are the prime drivers of the game's U.S. revival.

et, Anyone?



GRANGER COLLECTION, NEW YORK

"After I had given them a glass of sack we played cricket," a Virginia plantation owner wrote in a diary he kept between 1709 and 1712. The game occupied Americans through the Civil War (above, an 1879 U.S.-Britain match), but they soon turned their affection to a homegrown game called "baseball."

CRICKET—NOW PLAYED BY MILLIONS of people in 92 countries ranging from the Caribbean to Europe to Africa to South Asia—was once the national game of, yes, these United States. And one of the first outdoor sports to be played on these shores. An 1844 cricket match between teams from the United States and Canada was the first international sporting event in the modern world, predating the revival of the Olympic Games by more than 50 years.

In a diary he kept between 1709 and 1712, William Byrd, owner of the Virginia plantation Westover, noted, "I rose at 6 o'clock and read a chapter in Hebrew. About 10 o'clock Dr. Blair, and Major and Captain Harrison came to see us. After I had given them a glass of sack we played cricket. I ate boiled beef for my dinner. Then we played at shooting with arrows . . . and went to cricket again till dark."

The first public report of a cricket match in North America was in 1751, when the *New York Gazette* and the *Weekly Post Boy* carried an account of a match between a London "eleven" (as cricket teams, or "sides," are called) and one from New York City. The latter side won, though it is almost certain that both teams comprised residents of New York.

The rules of the game on this side of the Atlantic were formalized in 1754, when Benjamin Franklin brought back from England a copy of the 1744 Laws, cricket's official rule book. There is anecdotal evidence that George Washington's troops played what they called "wickets" at Valley Forge in the summer of 1778. After the Revolution, a 1786 advertisement for cricket equipment appeared in the *New York Independent Journal*, and newspaper reports of that time frequently mention "young gentlemen" and "men of fashion" taking up the sport. Indeed, the game came up in the debate over what to call the new nation's head of state: John Adams noted disapprovingly—and futilely—that "there are presidents of fire companies and cricket clubs."

As the country's growing population spread west and south, so too did cricket. Abe Lincoln reportedly turned out to watch Chicago play Milwaukee in 1849. By then, an estimated 10,000 Americans were playing the game, and many more were watching. But the seeds of cricket's destruction in the United States had already been sown.

TODAY, MANY AMERICANS dismiss cricket as an elitist game played by girlie-men. That may be because the game is superficially slow. Or because the players still tend to dress in

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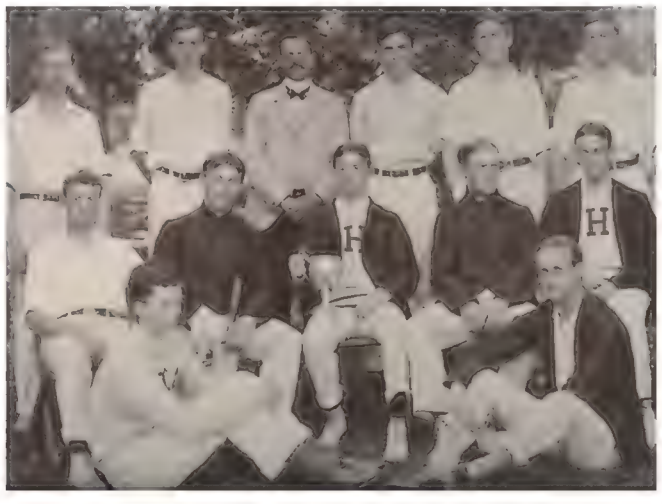
SIMON WORRALL *wrote about Benjamin Franklin's London house in the March issue.* **GREG FOSTER'S** *work appeared in December in a story about the Montgomery, Alabama, bus boycott.*

Philadelphia was, and remains, the crucible of North American cricket. In 1908, native son J. Barton King (above) set records that stood for 40 years. British-born Alfred Reeves (right) hopped a club wall to talk his way into a game. To this day, Haverford College fields a varsity team (below, in 1902).

traditional whites and, during four-day international matches, break for tea. Or maybe it's because, in a sporting world that seems to have turned increasingly nasty, the game's code of sportsmanship remains rectitudinously strict. (The recent unpleasantness during Pakistan's tour of England—an umpire ruled that Pakistan had doctored the ball; Pakistan staged an after-tea protest; the umpires declared the game a forfeit—set off a crisis that made baseball's steroids scandal seem subdued.)

But in most of the former Commonwealth, cricket is a game of the masses. This is especially true in cricket-mad South Asia, where last year's match between India and Pakistan was hailed as a sign of warming in the chilly relationship between the two countries (until, that is, India suggested it would side against Pakistan in the ball-scuffing affair). And most cricketers would argue that the game is far more dynamic, and dangerous, than baseball. For starters, a cricket ball is heavier—by half an ounce—than the ball used in the American game. With a core of cork, sheathed in layers of twine and cork shavings, and wrapped in a bright red leather casing (it is sometimes called a "cherry"), a cricket ball is a fearsome projectile when launched at a batsman. Unlike in baseball, the bowler (the equivalent of the pitcher) is in full flight after sprinting for up to 30 paces before launching the ball. Nor is it usually bowled through the air; that is a "full toss" and considered easy to hit. Far more often, the ball is bounced off the ground, whose grass has usually been trimmed and rolled to a concrete-like hardness, and it may rise toward the batsman's head as a "bouncer" or "bumper." Balls have been clocked at 95 miles per hour or more (as fast as a major-league fastball); before the introduction of safety helmets, in the 1970s, it was not uncommon for batsmen to be felled, or seriously injured, by bouncers.



The greatest American cricketer, a witty but tough Philadelphian named J. Barton King, was one of the fastest bowlers of his generation, and on a 1908 tour of England he set bowling records that stood for more than 40 years. One of the first athletes to take

TOP LEFT AND BOTTOM: CC MORRIS CRICKET LIBRARY AND UNITED STATES CRICKET MUSEUM AT HAVERFORD COLLEGE, HAVERFORD, PA (2); TOM WOLFF

Cricketers might argue that their game is more dynamic, and more dangerous, than baseball. A cricket ball (or "cherry") is a bit heavier than its American cousin, and the bowler usually bounces it off the ground on its way toward the wicket. The cherry may rise toward the batsman's head going 95 mph.

his physical condition seriously, King developed special exercises to strengthen his wrist and fingers (legend has it that he could send a cricket ball up to a second-story window with the snap of his fingers), and he analyzed his technique with scientific acumen. In his memoir, *The Angler and How I Bowled It*, King writes, "Pitchers were beginning to learn to throw what is called the 'hook,' that is, a ball that travels with very little curve until the last ten or twelve feet. . . . I began to experiment in order to develop the same kind of ball in cricket."

By the time King put away his bat, after the first decade of the 20th century, cricket had all but perished in the United States. While baseball's exact origins remain clouded in a romantic haze, and are still hotly debated, it seems fairly certain that it evolved from rounders, a game played by British schoolgirls. A year before the Civil War broke out, *Beadle's Dime Base-Ball Player*, published in New York City, sold 50,000 copies in the United States. Soldiers from both sides of the conflict carried it, and both North and South embraced the new game. It was faster than cricket, easier to learn and required little in the way of equipment: just a bat (simpler to make than a cricket bat, which requires sophisticated joinery), a ball and four gunnysacks thrown on a patch of ground, and you're ready to play.

Within a few years, baseball had swept all before it. By the early 1870s, there were 2,000 baseball clubs, 100,000 players, 250,000 spectators and, perhaps most important, a sound commercial structure.

Yet cricket went down swinging: in 1878, some 15,000 people in Philadelphia watched a local eleven hold the Australians, already emerging as a cricketing powerhouse, to a draw. Fifteen years later, Philadelphia—then, as now, the crucible of North American cricket—beat the Aussies. "In its heyday, Philadelphia had more than 100 cricket clubs," says John Douglas, acting director of athletics at Pennsylvania's Haverford College, the only U.S. college or university that still has a varsity cricket team. "Every neighborhood in Philadelphia had a cricket team, and all the teams supplied players for the famous Gentlemen of Philadelphia who toured England in the 19th century."

Built in 1904, the Haverford pavilion—cricket for locker room—smells of old wood and sweat. Sepia-tinted photographs of American players in white trousers hang on the walls. With names such as Ashbridge, Comfort and Congdon, Wood, Starr and Scattergood, the young men sport handlebar mustaches, blazers and striped caps. Douglas nods toward a picture of the 1873 team. "J. M. Fox was the captain of the cricket team, and he's also credited with bringing golf to America," he says.

Cricket for Dummies

It's a lot like baseball. Except that it's profoundly different

When I lived in Washington a few years back, my favorite spot in America was Section 336, high above home plate at the Baltimore Orioles' stadium, Camden Yards. My special delight was to take along our English visitors—all baseball virgins, all keen on cricket—and explain the American game by analogy with the English one. I never had a failure. They all grasped baseball, and they all relished it.

Notoriously, this process does not work in reverse. Thousands of Americans have gone to Lord's, cricket's London headquarters, and retreated in bewilderment. The most eloquent was Groucho Marx, who reputedly watched for an hour, and said: "This is great. When does it start?"

For sure, cricket seems inaccessible. But the superficial differences mask the essential truth: both cricket and baseball operate on the same principles. Someone hurling the ball—the pitcher in baseball, the bowler in cricket—is attempting to defeat an opponent wielding a bat to defend a target—the invisible strike zone or the visible wicket—and score runs.

The pitcher/bowler (using speed, swerve, spin or guile) is assisted by fielders while the batter's teammates await their turns. These fielders can remove the batter either by catching the ball or returning it to the batter's destination before he can get there. The batter's jackpot is hitting the ball in the air out of the field: a homer to you, a six to us. And the team that scores the most runs wins. Now, that wasn't so hard, was it?

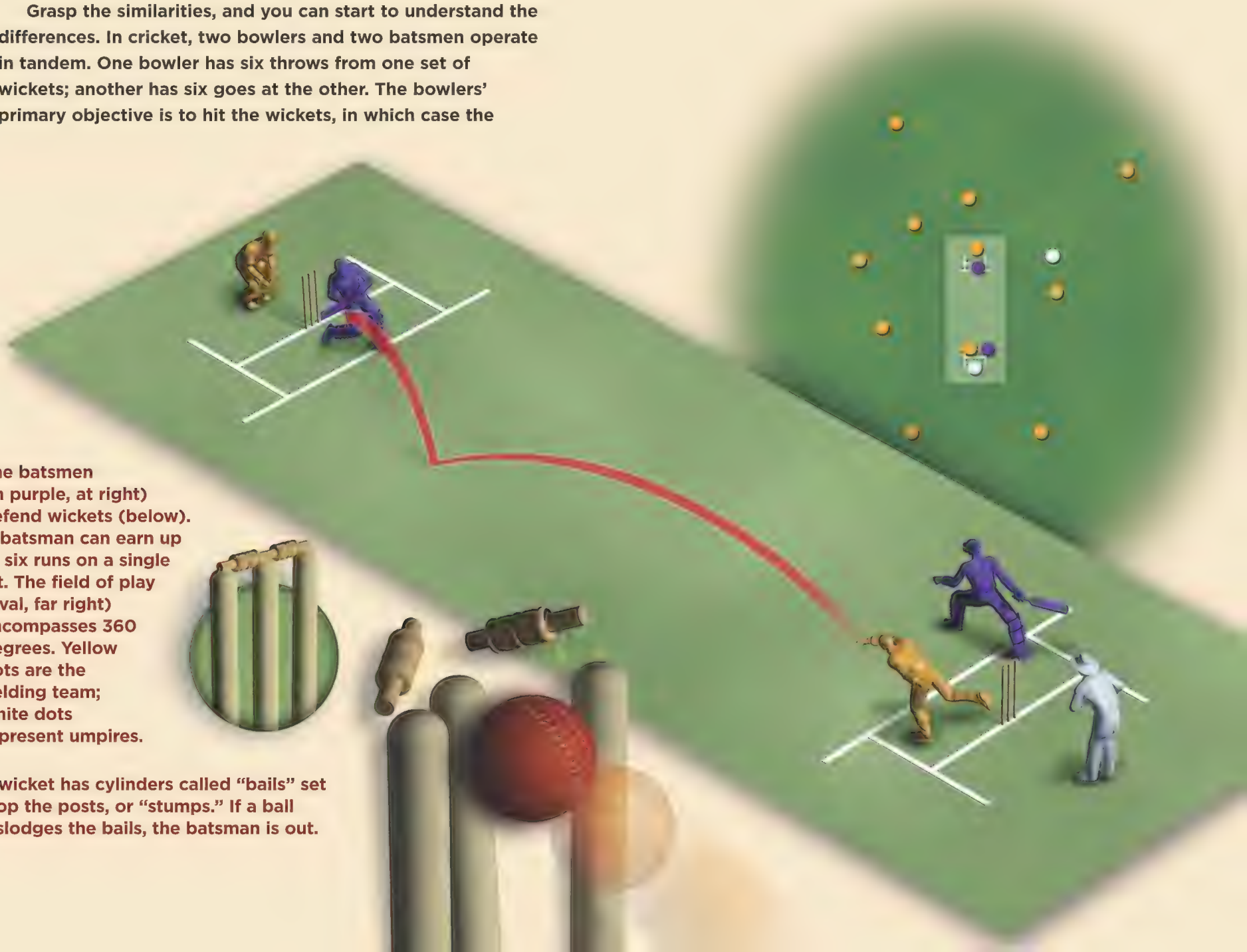
Grasp the similarities, and you can start to understand the differences. In cricket, two bowlers and two batsmen operate in tandem. One bowler has six throws from one set of wickets; another has six goes at the other. The bowlers' primary objective is to hit the wickets, in which case the batsman is out. When the onfield captain (not a manager) is fed up with the bowlers, they remain in the game as fielders and may try again later. The batsmen, for their part, are not obligated to run when one of them hits the ball, but they score runs when they run from wicket to wicket without being put out. And they stay at bat until they are out.

This can sometimes mean all day, or even longer: a batsman's aim is to score a hundred or more runs. But cricket is elastic. Games comprise either one or two innings, and can last five full days or be as short as a few hours. And yes, the players normally stop for lunch and tea. But that means the fans also get to eat during the breaks, instead of missing the best bits while lining up for hot dogs and pizza.

Cricket has other virtues. Because the cricket bat is wider and the ball can be successfully hit through 360 degrees, there is an infinite variety of shots, ranging from the bludgeoning to the elegant. And because the ball is meant to bounce en route to the batter, each game takes its character from the turf underfoot: wet or dry, fast or slow, flat or bumpy.

Of course, hardly anyone watches for five days solid, except the umpires. But the game must have something going for it. For the five-day Test between England and Australia scheduled for Melbourne on December 26, all 95,000 tickets were sold out for each of the first three days more than six months in advance.

MATTHEW ENGEL *is editor of* Wisden Cricketers' Almanack, *which has recorded every important game since 1864.*



The batsmen (in purple, at right) defend wickets (below). A batsman can earn up to six runs on a single hit. The field of play (oval, far right) encompasses 360 degrees. Yellow dots are the fielding team; white dots represent umpires.

A wicket has cylinders called "bails" set atop the posts, or "stumps." If a ball dislodges the bails, the batsman is out.

STEPHEN ROUNTREE

"When I came here, you couldn't find 11 people to make a team. Now we have 23 teams in the Atlanta region [alone]," says Desmond Lewis, who emigrated from Jamaica and coaches one of them. For area spectators, the game day attractions may include a seat in the shade and a ready supply of jerk chicken.

Sitting at a long wooden table in Haverford's C. C. Morris Cricket Library, the largest collection of cricket literature and memorabilia in the Western Hemisphere, Alfred Reeves, 81, is dressed in an immaculate blue blazer. Reeves immigrated to the United States from his native Yorkshire in 1978 and eventually settled in Philadelphia. "I went for a walk one evening near the Merion Cricket Club [near Philadelphia], and I was sure I heard a cricket ball and bat," he recalls. "So I put my whites on and climbed over the wall of this famous cricket club, dropped on the other side and said, 'I just arrived from England. Do you mind if I join in?'"

No one minded. Reeves, who had loved the game since childhood—"more than 60 years of weekend cricket" is how he describes his marriage—was soon playing for Merion, one of America's oldest and best-known clubs. But by the time Reeves joined, cricket's golden age had long since given way to baseball, tennis and golf. The British themselves may have provided the coup de grâce for cricket in the United States when, in 1909, the Imperial Cricket Conference was founded to govern the game and ruled that no country outside the British Empire could belong.

Now, improbably, North American cricket is bouncing back, thanks in no small part to the huge influx of immigrants from countries such as India, Pakistan and those of the Caribbean. An estimated 30,000 people play or watch cricket in the United States each year. In 2005, New York City mayor Michael Bloomberg announced plans to build a $1.5 million cricket pitch at St. Albans Park, Queens. In Philadelphia, Alfred Reeves has helped revive the famous British Officers' Cricket Club, which now competes against about 20 clubs in and around the city, including one—the Philadelphia Cricket Club—whose roster includes a two-thirds majority of U.S.-born players.

"I had always been interested in the game," says Chris Spaeth, 36, a Philadelphia Cricket Club regular who was exposed to it at Colorado State University, where there was a large contingent of Indian students. "When I moved back to Philly, I played soccer. But there

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Can a game whose rules mandate gentlemanly conduct find a place in a sporting culture too often defined by inflated egos and commercialism? As the question reverberates in cities from coast to coast, men in whites, and the people who come out to watch them play, offer their own emphatic answer.

wasn't the camaraderie I was looking for, the sporting element. So I found my way to cricket."

So did Doug Genna, a jovial, 22-year-old Haverford graduate. Genna was a wrestler and a lacrosse goalie in high school. When he took up cricket at Haverford, he naturally gravitated toward wicket keeper, the position closest to goalie and roughly analogous to a catcher in baseball. For Genna, the most difficult adjustment was the length of time each cricket match takes. As with baseball, there is no time limit and no clock. "Wrestling takes six minutes," he says. "Now I have to play in a match that can last for six hours. It's a big challenge to keep myself mentally focused."

In recent years, cricket has moved beyond New York and Philadelphia to Dallas, Wichita, Los Angeles and Atlanta, the home of Desmond Lewis, 60, a soft-spoken Jamaican who used to play at the pinnacle of the game. (In 1971 he played for the West Indies team and batted alongside Sir Garfield Sobers, a player of Babe Ruthian stature.) "When I came here, you couldn't find 11 people to make a team," Lewis says. "Now we have 23 teams in the Atlanta region, with about 400 players actively involved." As we talk, his team, Tropical Sports Club, is on its way to defeating North Atlanta, which includes Faizan Sayeed, 19. Sayeed, who immigrated to Atlanta from Pakistan in 1990, helped the U.S. Under-19 team to a surprise victory over Canada in a world championship qualifying match in Toronto last September. When I ask if he feels more American or Pakistani, he says: "When it comes to cricket, I definitely feel [more] American."

A new organization, Major League Cricket, recently unveiled a ten-year development plan intended to rebuild the sport from the ground up by working with schools and other local authorities to develop young talent. But can cricket find a place in a culture dominated by football, baseball, basketball and NASCAR? In a sporting age too often defined by inflated egos and commercialism, it would be nice to think so. "Liberty must be developed from within," wrote John Lester, who was born in Britain but played his cricket in Philadelphia. "And there is only one form of government that can breed it—personal self-government. . . . If cricket is alien to our ideal of democracy, so much the worse for our democracy."

Or, as Alfred Reeves puts it, "Cricket is the only sport in the world that has gentlemanly conduct written into the laws. Part of my gospel is: It's the game first; then it's the team; then it's the player. You're last. And don't ever forget it." Those sentiments may sound somewhat treacly nowadays, but there was a time when they made perfect sense.

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FABRIC *of* THEIR LIVES

There's a new exhibition of works by the quilters of Gee's Bend, Alabama, whose lives have been transformed by worldwide acclaim for their artistry

BY AMEI WALLACH
PORTRAITS BY JOHN F. FICARA

"All I know is that the museum's a better place because of the Gee's Bend exhibitions," says Peter Marzio, director of the Museum of Fine Arts, Houston (shown here). "They expand the sense of what art can be." The new show (quilts at left and above are by Loretta P. Bennett) opened in Houston in June.

ANNIE MAE YOUNG: "I just put some pieces together in my own head, in my own mind how I want it." It was Young's 1976 work-clothes quilt (below) that caught collector William Arnett's eye and led to the Gee's Bend exhibitions.

ANNIE MAE YOUNG is looking at a photograph of a quilt she pieced together out of strips torn from well-worn cotton shirts and polyester pants. "I was doing this quilt at the time of the civil rights movement," she says, contemplating its jazzy, free-form squares (opposite).

Martin Luther King Jr. came to Young's hometown of Gee's Bend, Alabama, around that time. "I came over here to Gee's Bend to tell you, You are somebody," he shouted over a heavy rain late one winter night in 1965. A few days later, Young and many of her friends took off their aprons, laid down their hoes and rode over to the county seat of Camden, where they gathered outside the old jailhouse.

"We were waiting for Martin Luther King, and when he drove up, we were all slappin' and singin'," Young, 78, tells me when I visit Gee's Bend, a small rural community on a peninsula at a deep bend in the Alabama River. Wearing a red tur-

JOHN F. FICARA; COLLECTION OF THE TINWOOD ALLIANCE; PP.66, 67 GEE'S BEND: ARCHITECTURE OF THE QUILT, MUSEUM OF FINE A

Critic **AMEI WALLACH** *writes on culture and the arts for such publications as the* New York Times, Art in America *and* Vanity Fair. *Photographer* **JOHN F. FICARA***'s most recent book,* Black Farmers in America, *was published earlier this year.*

COLLECTION OF THE TINWOOD ALLIANCE

The "strikingly beautiful" Gee's Bend quilts (above, Annie May Young's c. 1965 multiple-border quilt), wrote *New York* magazine art critic Mark Stevens of the first show, "just might deserve a place among the great works of twentieth-century abstract art."

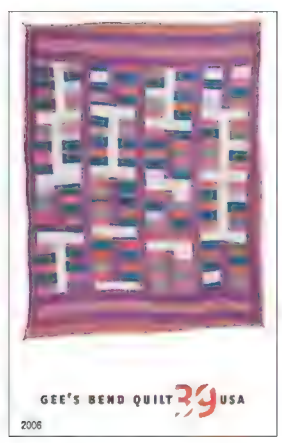
ban and an apron bright with pink peaches and yellow grapes, she stands in the doorway of her brick bungalow at the end of a dirt road. Swaying to a rhythm that nearly everyone in town knows from a lifetime of churchgoing, she breaks into song: "We shall overcome, we shall overcome. . . . "

"We were all just happy to see him coming," she says. "Then he stood out there on the ground, and he was talking about how we should wait on a bus to come and we were all going to march. We got loaded on the bus, but we didn't get a chance to do it, 'cause we got put in jail," she says.

Many who marched or registered to vote in rural Alabama in the 1960s lost their jobs. Some even lost their homes. And the residents of Gee's Bend, 60 miles southwest of Montgomery, lost the ferry that connected them to Camden and a direct route to the outside world. "We didn't close the ferry because they were black," Sheriff Lummie Jenkins reportedly said at the time. "We closed it because they *forgot* they were black."

SIX OF YOUNG'S quilts, together with 64 by other Gee's Bend residents, have been traveling around the United States in an exhibition that has transformed the way many people think about art. Gee's Bend's "eye-poppingly gorgeous" quilts, wrote *New York Times* art critic Michael Kimmelman, "turn out to be some of the most miraculous works of modern art America has produced. Imagine Matisse and Klee (if you think I'm wildly exaggerating, see the show), arising not from rarefied Europe, but from the caramel soil of the rural South." Curator Jane Livingston, who helped organize the exhibition with collector William Arnett and art historians John Beardsley and Alvia Wardlaw, said that the quilts "rank with the finest abstract art of any tradition." After stops in such cities as New York, Washington, D.C., Cleveland, Boston and Atlanta, "The Quilts of Gee's Bend" will end its tour at the Fine Arts Museums of San Francisco's de Young Museum December 31.

The bold drama of the quilt Young was working on in 1965 is also found in a quilt she made out of work clothes 11 years later. The central design of red and orange corduroy in that quilt (p. 68) suggests prison bars, and the faded denim that surrounds it could be a comment on the American dream. But Young had more practical considerations. "When I put the quilt together," she says, "it wasn't big enough, and I had to get some more material and make it bigger, so I had these old jeans to make it bigger."



Collector William Arnett was working on a history of African-American vernacular art in 1998 when he came across a photograph of Young's workclothes quilt draped over a woodpile. He was so knocked out by its originality, he set out to find it. A couple of phone calls and some creative research later, he and his son Matt tracked Young down to Gee's Bend, then showed up unannounced at her door late one evening. Young had burned some quilts the week before (smoke from burning cotton drives off mosquitoes), and at first she thought the quilt in the photograph had been among them. But the next day, after scouring closets and searching under beds, she found it and offered it to Arnett for free. Arnett, however, insisted on writing her a check for a few thousand dollars for that quilt and several others. (Young took the check straight to the bank.) Soon the word spread through Gee's Bend that there was a crazy white man in town paying good money for raggedy old quilts.

When Arnett showed photos of the quilts made by Young and other Gee's Benders to Peter Marzio, of the Museum of Fine Arts, Houston (MFAH), he was so impressed that he agreed to put on an exhibition. "The Quilts of Gee's Bend" opened there in September 2002.

The exhibition revived what had been a dying art in Gee's Bend. Some of the quilters, who had given in to age and arthritis, are now back quilting again. And many of their children and grandchildren, some of whom had moved away from Gee's Bend, have taken up quilting themselves. With the help of Arnett and the Tinwood Alliance (a nonprofit organization that he and his four sons formed in 2002), fifty local women founded the Gee's Bend Quilters Collective in 2003 to market their quilts, some of which now sell for more than $20,000. (Part goes directly to the maker, the rest goes to the collective for expenses and distribution to the other members.)

Now a second exhibition, "Gee's Bend: The Architec-

ARLONZIA PETTWAY: "It was just born in me to make things." Her great-grandmother was brought to Alabama as a slave.

DAVID RACCUGLIA; STAMP: © 2006 USPS. USED WITH PERMISSION. ALL RIGHTS RESERVED.

The quilting tradition in Gee's Bend goes back to the 1800s, when slaves fashioned bedcovers out of strips of cloth. Arlonzia Pettway's "Lazy Gal" quilt (left) is from c. 1975. Her mother, Missouri, made "Path Through the Woods" (right) in 1971.

ture of the Quilt," has been organized by the MFAH and the Tinwood Alliance. The show, which opened in June, features newly discovered quilts from the 1930s to the 1980s, along with more recent works by established quilters and the younger generation they inspired. The exhibition will travel to seven other venues, including the Indianapolis Museum of Art (October 8-December 31) and the Orlando Museum of Art (January 27-May 13, 2007).

ARLONZIA PETTWAY lives in a neat, recently renovated house off a road plagued with potholes. The road passes by cows and goats grazing outside robin's-egg blue and brown bungalows. "I remember some things, honey," Pettway, 83, told me. (Since my interview with her, Pettway suffered a stroke, from which she is still recovering.) "I came through a hard life. Maybe we weren't bought and sold, but we were still slaves until 20, 30 years ago. The white man would go to everybody's field and say, 'Why you not at work?'" She paused. "What do you think a slave *is*?"

As a girl, Pettway would watch her grandmother, Sally, and her mother, Missouri, piecing quilts. And she would listen to their stories, many of them about Dinah Miller, who had been brought to the United States in a slave ship in 1859. "My great-grandmother Dinah was sold for a dime," Pettway said. "Her dad, brother and mother were sold to different people, and she didn't see them no more. My great-grandfather was a Cherokee Indian. Dinah was made to sleep with this big Indian like you stud your cow. . . . You couldn't have no skinny children working on your slave master's farm." In addition to Pettway, some 20 other Gee's Bend quiltmakers are Dinah's descendants.

The quilting tradition in Gee's Bend may go back as far as the early 1800s, when the community was the site of a cotton plantation owned by a Joseph Gee. Influenced, perhaps, by the patterned textiles of Africa, the women slaves began piecing strips of cloth together to make bedcovers. Throughout the post-bellum years of tenant farming and well into the 20th century, Gee's Bend women made quilts to keep themselves and their children warm in unheated shacks that lacked running water, telephones and electricity. Along the way they developed a distinctive style, noted for its lively improvisations and geometric simplicity.

Gee's Bend men and women grew and picked cotton, peanuts, okra, corn, peas and potatoes. When there was no money to buy seed or fertilizer, they borrowed one or both from Camden businessman E. O. Rentz, at interest rates only those without any choice would pay. Then came the Depression. In 1931 the price of cotton plummeted, from about 40 cents a pound in the early 1920s, to about a nickel. When Rentz died in 1932, his widow foreclosed on some 60 Gee's Bend families. It was late fall, and winter was coming.

"They took everything and left people to die," Pettway said. Her mother was making a quilt out of old clothes when she heard the cries outside. She sewed four wide shirttails into a sack, which the men in the family filled with corn and sweet potatoes and hid in a ditch. When the agent

COLLECTION OF THE TINWOOD ALLIANCE (2)

LORETTA PETTWAY: "I thank God that people want me to make quilts. I feel proud and happy. The Lord give me strength to make this quilt with love and peace and happiness so somebody would enjoy it. I'm doing something with my life."

for Rentz's widow came around to seize the family's hens, Pettway's mother threatened him with a hoe. "I'm a good Christian, but I'll chop his damn brains out," she said. The man got in his wagon and left. "He didn't get to my mama that day," Pettway told me.

Pettway remembered that her friends and neighbors foraged for berries, hunted possum and squirrels, and mostly went hungry that winter until a boat with flour and meal sent by the Red Cross arrived in early 1933. The following year, the Federal Emergency Relief Administration provided small loans for seed, fertilizer, tools and livestock. Then, in 1937, the government's Resettlement Administration (later the Farm Security Administration) bought up 10,000 Gee's Bend acres and sold them as tiny farms to local families.

In 1941, when Pettway was in her late teens, her father died. "Mama said, 'I'm going to take his work clothes, shape them into a quilt to remember him, and cover up under it for love.'" There were hardly enough pants legs and shirttails to make up a quilt, but she managed. (That quilt—jostling rectangles of faded gray, white, blue and red—is included in the first exhibition.) A year later, Arlonzia married Bizzell Pettway and moved into one of the new houses built by the government. They had 12 children, but no electricity until 1964 and no running water until 1974. A widow for more than 30 years, Arlonzia still lives in that same house. Her mother, Missouri, who lived until 1981, made a quilt she called "Path Through the Woods" (p. 71) after the 1960s freedom marches. A quilt that Pettway pieced together during that period, "Chinese Coins" (p. 70, stamp), is a medley of pinks and purples—a friend had given her purple scraps from a clothing factory in a nearby town.

"At the time I was making that quilt, I was feeling something was going to happen better, and it did," Pettway says. "Last time I counted I had 32 grandchildren and I think between 13 and 14 great-grands. I'm blessed now more than many. I have my home and land. I have a deepfreeze five feet long with chicken wings, neck bones and pork chops."

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COLLECTION OF THE TINWOOD ALLIANCE

For many years, says Loretta Pettway, who is Arlonzia's first cousin, "I just had scraps of what I could find. Now I see my quilts hanging in a museum." Her 2003 variation on the "Housetop" pattern (above) is in the most recent Gee's Bend exhibit.

MARY LEE BENDOLPH: "Most of my ideas come from looking at things. I can walk outside in the yard and see ideas all around. Then, sitting down looking at a quilt [above, her 2003 "blocks and strips" from the new show] I get another idea."

THE FIRST EXHIBITION featured seven quilts by Loretta Pettway, Arlonzia Pettway's first cousin. (One in three of Gee's Bend's 700 residents is named Pettway, after slave owner Mark H. Pettway.) Loretta, 64, says she made her early quilts out of work clothes. "I was about 16 when I learned to quilt from my grandmama," she says. "I just loved it. That's all I wanted to do, quilt. But I had to work farming cotton, corn, peas and potatoes, making syrup, putting up soup in jars. I was working other people's fields too. Saturdays I would hire out; sometimes I would hire out Sundays, too, to give my kids some food. When I finished my chores, I'd sit down and do like I'm doing now, get the clothes together and tear them and piece. And then in summer I would quilt outside under the big oak." She fingers the fabric pieces in her lap. "I thank God that people want me to make quilts," she says. "I feel proud. The Lord lead me and guide me and give me strength to make this quilt with love and peace and happiness so somebody would enjoy it. That makes me feel happy. I'm doing something with my life."

In 1962 the U.S. Congress ordered the construction of a dam and lock on the Alabama River at Miller's Ferry, just south of Gee's Bend. The 17,200-acre reservoir created by the dam in the late 1960s flooded much of Gee's Bend's best farming land, forcing many residents to give up farming. "And thank God for *that*," says Loretta. "Farming wasn't nothing but hard work. And at the end of the year you couldn't get nothing, and the little you got went for cottonseed."

Around that time, a number of Gee's Bend women began making quilts for the Freedom Quilting Bee, founded in 1966 by civil rights worker and Episcopalian priest Francis X. Walter to provide a source of income for the local community. For a while, the bee (which operated for about three decades) sold quilts to such stores as Bloomingdale's, Sears, Saks and Bonwit Teller. But the stores wanted assembly-line quilts, with orderly, familiar patterns and precise stitching—not the individual, often improvised and unexpected patterns and color combinations that characterized the Gee's Bend quilts.

"My quilts looked beautiful to me, because I made what I could make from my head," Loretta told me. "When I start I don't want to stop until I finish, because if I stop, the ideas are going to go one way and my mind another way, so I just try to do it while I have ideas in my mind."

Loretta had been too ill to attend the opening of the first exhibition in Houston. But she wore a bright red jacket and a wrist corsage of roses to the opening of the second show last spring. Going there on the bus, "I didn't close my eyes the whole way," she says. "I was so happy, I had to sightsee." In the new show, her 2003 take on the popular

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LOUISIANA P. BENDOLPH: Seven of Bendolph's quilts (right, her interpretation of the "Housetop" pattern) are in the new show. "Part of me feels like I'm living in a dream," she says. "I'm still learning to accept the fact that people think of me as an artist."

"Housetop" pattern—a variant of the traditional "Log Cabin" design—is an explosion of red polka dots, zany stripes and crooked frames within frames (a dramatic change from the faded colors and somber patterns of her early work-clothes quilts). Two other quilts made by Loretta are among those represented on a series of Gee's Bend stamps issued this past August by the U.S. Postal Service. "I just had scraps of what I could find," she says about her early work. "Now I see my quilts hanging in a museum. Thank God I see my quilts on the wall. I found my way."

MARY LEE BENDOLPH, 71, speaks in a husky voice and has a hearty, throaty laugh. At the opening of the new exhibition in Houston, she sported large rhinestone earrings and a chic black dress. For some years, kidney disease had slowed her quiltmaking, but the first exhibition, she says, "spunked me to go a little further, to try and make my quilts a little more updated." Her latest quilts fracture her backyard views and other local scenes the way Cubism fragmented the cafés and countryside of France. Her quilts share a gallery with those of her daughter-in-law, Louisiana Pettway Bendolph.

Louisiana now lives in Mobile, Alabama, but she remembers hot, endless days picking cotton as a child in the fields around Gee's Bend. From age 6 to 16, she says, the only time she could go to school was when it rained, and the only play was softball and quiltmaking. Her mother, Rita Mae Pettway, invited her to the opening in Houston of the first quilt show. On the bus ride home, she says, she "had a kind of vision of quilts." She made drawings of what would become the quilts in the new exhibition, in which shapes seem to float and recede as if in three dimensions.

"Quilting helped redirect my life and put it back together," Louisiana says. "I worked at a fast-food place and a sewing factory, and when the sewing factory closed, I stayed home, being a housewife. You just want your kids to see you in a different light, as someone they can admire. Well, my children came into this museum, and I saw their faces."

To Louisiana, 46, quiltmaking is history and family. "We think of inheriting as land or something, not things that people teach you," she says. "We came from cotton fields, we came through hard times, and we look back and see what all these people before us have done. They brought us here, and to say thank you is not enough." Now her 11-year-old granddaughter has taken up quiltmaking; she, however, does her drawings on a computer.

In Gee's Bend not long ago, her great-grandmother Mary Lee Bendolph picked some pecans to make into candy to have on hand for the children when the only store in town is closed, which it often is. Then she soaked her feet. Sitting on her screened-in porch, she smiled. "I'm famous," she said. "And look how old I am." She laughed. "I enjoy it."

Visit Smithsonian.com for more images from the exhibition.

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Neanderthal Man

Svante Paabo has probed the DNA of Egyptian mummies and extinct animals. Now he hopes to learn more about what makes us tick by decoding the DNA of our evolutionary cousins **BY STEVE OLSON**

AS A BOY IN SWEDEN, Svante Paabo read everything he could about ancient civilizations. After powerful North Sea storms uprooted trees, he begged his parents to take him to archaeological sites to look for potsherds and other artifacts. When he was 13, his mother, a food chemist in Stockholm, yielded to her son's most frequent request: to visit Egypt. "It was absolutely fascinating," he recalls. "We went to the pyramids, to Karnak and the Valley of the Kings. The soil was full of artifacts."

Paabo, 51, is still looking for artifacts, but in a very different place. He's a leader of the worldwide quest to explore the past by analyzing human DNA. He has helped show that human groups—southern Africans, Western Europeans, Native Americans—are closely related, despite superficial distinctions. He has been uncovering key genetic changes that helped transform our shambling, hirsute ancestors into the brainy bipeds we are today. This past summer, Paabo announced that he and his co-workers were going to take the next—and biggest—step, in their effort to resurrect the genome of the Neanderthal, our distant evolutionary cousin, who went extinct 30,000 years ago. The first scientist to analyze segments of DNA from Neanderthal bones, Paabo now wants to re-create the entire DNA sequence of a Neanderthal and compare it with our own, looking for the reasons that one evolutionary experiment failed and the other succeeded. "He really is a visionary," says Mary-Claire King, a geneticist at the University of Washington.

Paabo is director of the genetics department at the gleaming new Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. But you'd never guess his heady position from his taste in clothes, which leans toward shorts and Hawaiian shirts. In his simply decorated office, he kicks off his clogs, folds his long legs under his angular body to perch on a sofa, and grins. "It is a wonderful time to be working in this field," he says.

Ever since the 1940s, when DNA was identified as the molecule that carries genetic information between generations, scientists have predicted that the study of genetics would yield great things, from drought-resistant crops to cures for genetic diseases. Recently, geneticists have realized that there is another way of looking at DNA—as a link to history. All of us inherited our DNA from our biological parents, who inherited it from their biological parents, and so on. Like an ancient manuscript that is copied and recopied with each generation, DNA bears tales from beyond memory. It also carries a unique time stamp: DNA is copied imperfectly, and these minor changes are passed from one generation to the next. Scientists can date these changes by comparing DNA among humans or between humans and other species. In this way, DNA connects us not only with our ancestors but also with the animals from which we evolved.

Paabo (above, on a trip to Egypt at age 13 and, opposite, in Leipzig in 2002) was obsessed with ancient history. Now he wants to sequence the Neanderthal genome. "He really is a visionary," says one colleague.

Paabo enrolled at the University of Uppsala, in 1975, to study Egyptology. But rather than excavate exotic archaeological sites, as he expected, he spent most of his time conjugating ancient Egyptian verbs. "It was not at all what I wanted to do." Soon he found himself in medical school, a route his biochemist

SVANTE PAABO

BELA DORNON / MPI-EVA

Did Neanderthals interbreed with the newcomers, contributing DNA to the gene pool of today's humans?

father had also taken. Then he entered a PhD program in molecular immunology. Still, he couldn't shake his fascination with Egypt. "I knew about these thousands of mummies that were around in museums," he recalls, "so I started to experiment with extracting DNA." With the help of his old Egyptology professors, Paabo obtained skin and bone samples from 23 mummies. Working nights and weekends (Paabo was worried that his immunology professor would not approve of the project), he succeeded in extracting and analyzing a short segment of DNA from the 2,400-year-old mummy of an infant boy. In early 1985, he sent his results to *Nature*, one of the world's leading scientific journals, which made the paper its cover story—the equivalent in science of hitting a grand slam in your first professional at-bat.

Paabo also sent a copy of the manuscript to Allan Wilson, a molecular biologist at the University of California at Berkeley. Wilson had made headlines when he and his colleagues extracted a fragment of DNA from the remains of a quagga, a zebra-like creature that went extinct in 1883. After Wilson read Paabo's paper, he asked if he could go to Paabo's lab for a sabbatical. "I hadn't even finished my PhD!" Paabo says. Paabo wrote back with a counteroffer: Could he work in Wilson's lab?

Paabo astounded his colleagues two decades ago with his finding that Egyptian mummies (Ramses I, above) can contain DNA that is still decipherable some 3,000 years later. Soon Paabo's genetic studies were taking him much farther back in time.

Wilson, who died of leukemia in 1991 at the age of 56, "was one of the best people I've ever seen at generating ideas," says Mark Stoneking, who worked with Wilson in the 1980s and is now one of Paabo's colleagues at the institute. Stoneking helped Wilson establish the existence of "mitochondrial Eve"—a woman who lived in Africa about 200,000 years ago. The Berkeley scientists traced our ancestry to her by analyzing the DNA in mitochondria, parts of a cell that produce energy and operate somewhat independently of the rest of the cell. We inherit mitochondria through our mothers, grandmothers, great-grandmothers, and so on. By analyzing the mitochondrial DNA of people throughout the world, Wilson and his colleagues determined that the maternal lineages of everyone alive today converge on a single ancient woman.

Paabo, meanwhile, was developing new ways of extracting DNA from preserved specimens of extinct organisms, including moas (a giant flightless bird) and marsupial wolves. Others in Wilson's lab were trying to find DNA in fossilized plants and animals. In the acknowledgments of his 1990 novel *Jurassic Park*, author Michael Crichton gives part of the credit for his inspiration to Berkeley's Extinct DNA Study Group.

Paabo landed his first academic post at the University of Munich in 1990. There he expanded his work on the DNA of ancient animals and plants—mammoths, maize, European cave bears. He also resumed his work on ancient human DNA; for example, he was part of the team that managed to sequence some DNA from the "Ice Man," who was frozen into a glacier in the Tyrolean Alps more than five millennia ago and discovered in 1991. That success fired Paabo's ambition to take on one of the toughest questions in paleoanthropology: What is the nature of our kinship with extinct hominids?

In 1856, two quarrymen dug up a set of odd-looking human bones in the Neander Valley, near Düsseldorf, Germany. The remains were the first recognized traces of a group that came to be known as the Neanderthals (*thal* means "valley" in German). For the past 150 years, scientists have argued about the relationship between today's humans and these vanished people. When anatomically modern humans—the ancestors of today's Europeans—began migrating into Europe about 40,000 years ago, did the Neanderthals simply die out? Or did they interbreed with the newcomers, contributing some DNA to the gene pool of today's humans?

Paabo decided to look for DNA in the original Neanderthal bones. Needless to say, the curators at the Rhineland Museum in Bonn, who are responsible for the fossilized bones, were not eager to let him take samples. Analyzing the bones would mean grinding up irreplaceable fossil material and dissolving it in chemicals. But Paabo persisted, and the curators finally agreed. A bone specialist sawed a half-inch chunk from the upper right arm bone of a 42,000-year-old Neanderthal fossil.

Paabo handed over the sample to graduate student Matthias Krings, who wasn't optimistic—extracting DNA from 3,000-year-old mummies had been hard enough. He focused on DNA from the mitochondria, which is much shorter and more plentiful than the DNA that dictates the workings of the rest of the body. Soon Krings began to find DNA sequences that were clearly different from those of any human beings living today.

The results, along with those of subsequent studies, indi-

STEVE OLSON *is the author of* Mapping Human History: Genes, Race and our Common Origins.

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The four directors agreed to focus their efforts on one particular question: What makes human beings unique?

cated that Neanderthals contributed little, if any, DNA to modern humans. Instead, they appear to have been displaced by modern humans—the taller, more graceful creatures with round skulls and prominent chins who first appear in the fossil record in eastern Africa about 200,000 years ago. The Neanderthals retreated into more remote parts of Europe before going extinct. Paabo's work means that during the thousands of years that Neanderthals shared the continent with modern humans, there was probably little interbreeding between the two groups. The same thing happened in other parts of the world: archaic populations of humans in Africa and Asia gradually went extinct without leaving an obvious genetic trace.

The apparent lack of interbreeding between archaic and modern humans means that we are a very young species—brash upstarts that overran the older and more established species of humans. "In a sense, we are all Africans, though some of us have gone to live in exile," Paabo says. To be sure, physical appearances changed as groups of modern humans moved into different environments. For example, as they moved into northern climates, natural selection appears to have favored lighter skin colors—probably because lighter skin admits more sunlight and thereby allows the body to synthesize sufficient vitamin D to endure long, dark winters. As a result, over many generations, the occupants of northern Europe and Asia gradually developed lighter skin than their ancestors. But these superficial differences disguise a remarkable genetic similarity. "Different subgroups of chimpanzees, such as those in eastern or western Africa," says Paabo, "have a much longer history of genetic separation than do, say, Chinese and Africans."

This year marks the 150th anniversary of the discovery of Neanderthals (a close-up of a museum model in Germany). By comparing their genes with ours, Paabo hopes to identify some of the evolutionary changes that make us human.

THE GERMAN GOVERNMENT provided very little support for anthropological research after World War II, a response to abhorrent wartime activities of the Kaiser Wilhelm Institute for Anthropology, Human Genetics and Eugenics in Berlin. (The head of the institute supported Nazi racial policies, and his assistant, Josef Mengele, sent body parts from Auschwitz to be studied at the institute.) But following the 1990 reunification of Germany, officials began looking for neglected areas of science to support in the effort to build new ties between East and West. In 1997, the government invited Paabo to move to Leipzig, a university town in the former East Germany, to start a new institute on human evolution with three other prominent scientists: Christophe Boesch of the University of Basel in Switzerland, who studies wild chimpanzees; Bernard Comrie, a linguist from the University of Southern California in Los Angeles; and psychologist Michael Tomasello from the Yerkes Primate Center in Atlanta. In the summer of 1997, the four scientists set off for a hike in the Alps south of Munich to mull over the invitation. By the time they returned from the mountains, they had decided to accept it. "There's no reason to let Hitler keep us from working on human origins anymore," says Paabo.

Originally housed in an old Leipzig publishing house, the Institute for Evolutionary Anthropology moved in 2002 into a new $30 million building south of downtown. The four directors collaborated on the design, with Paabo insisting that a four-story rock-climbing wall be installed in the lobby. The directors agreed to focus their efforts on one particular question: What makes human beings unique? And to avoid empty speculation, they decided to work only on questions for which data are available. "The kinds of questions we ask are ones where we can see how to go about finding answers," says Comrie.

One day, Tomasello and Paabo were talking in the institute's cafeteria about a family in England with a remarkable genetic defect. Some members of the family have a mutation in a gene known as FOXP2, which helps direct the development of the brain during infancy and childhood. Every family member with the mutation had great difficulty speaking. Paabo had been thinking about how to identify genes that had changed during human evolution to make speech possible, and FOXP2 seemed like a prime candidate. He and his co-workers sequenced the gene—that is, they figured out the order of the DNA bases that make up FOXP2—in six different species. They found that it was one of the most stable genes they had ever studied; from mice to rhesus macaques to chimps, the protein produced by the gene is almost exactly identical, suggesting that the gene itself plays a fundamental role in animal function. But in humans the gene had undergone a slight modification. About 250,000 years ago, according to the scientists' calculations, two of the molecular units in the 715-unit DNA sequence of the gene abruptly changed. That's not long before modern humans first appeared in the fossil record. Could the

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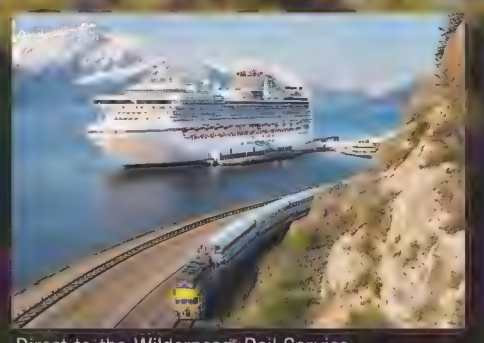

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Will people come to see themselves as biological automatons bereft of compassion and morality?

changes in FOXP2 have enabled modern humans to speak? And could articulate speech have given modern humans an edge over the Neanderthals and other archaic humans?

That's certainly what some newspaper stories implied, labeling FOXP2 a "language gene." But Paabo and other scientists are more cautious. FOXP2 "is one of who knows how many genes that affect language ability," says Ken Weiss, an expert on evolution and genetics at Pennsylvania State University. The change in FOXP2 might have been entirely coincidental. Or the gene may be related to language indirectly—for example, by influencing coordination. And some scientists argue that language evolved much earlier than our version of FOXP2, and that archaic humans also had speech.

Still, Paabo's work on FOXP2 has raised fruitful questions. Researchers are genetically engineering mice with "broken" FOXP2 genes, to see how disruptions in the gene might affect the animals. Also, researchers are splicing the human version of the gene into mice to see if it makes any difference. (So far, none of the mice have started talking.)

More recently, Paabo has taken an even broader view of the genetic changes responsible for our uniquely human traits. For example, mutations in individual genes like FOXP2 may not be the most important force in evolution. An even bigger factor may be changes in the genetic switches that turn on and off many genes at once. Paabo and his colleagues have been looking at the patterns of gene activity in humans, chimps and other species. As might be expected, the brain has been a particularly active site for recent human evolution. Paabo's team finds that genes in the human brain have undergone more changes in how they are turned on than similar genes in chimp brains.

Scientists describe Neanderthals (above, at left) as more "robust" than modern humans. But despite their apparent toughness, Neanderthals died out not long after the newcomers took over their turf.

Paabo is also returning to one of his original obsessions. Using a fossil from a site in Croatia, he and his colleagues are trying to derive much longer Neanderthal DNA sequences—not just the DNA that runs the mitochondria, but the DNA that is responsible for building the rest of the body. Their goal is to reconstruct the entire genetic blueprint for making a Neanderthal. It's a technically daunting task, and Paabo estimates it will take about two years to finish. But being able to compare our genome with that of our evolutionary relatives could highlight key turning points in our evolution.

The ultimate goal of his research, Paabo says, is to identify the genetic changes that made us human. Of course, no historical event can ever be reconstructed completely. But by studying our DNA, scientists eventually will be able to say which genes changed, when they changed, and maybe even why they changed. At that point, we'll have something we've never had before: a scientifically plausible and relatively complete story of our biological origins.

ABOUT A MILE north of the institute, down a dim alley and a flight of stairs, is a very old restaurant known as Auerbach's Cellar. In Johann Wolfgang von Goethe's 1808 epic play "Faust," the devil and Faust go drinking at Auerbach's. Shortly thereafter, Faust meets and talks with two apes—symbols, for Goethe, of human sinfulness and folly.

Faust, of course, sold his soul to the devil for knowledge. Will the knowledge generated by studying our DNA place limits on the human soul? Will people come to see themselves as biological automatons bereft of compassion and morality? Will genetics "biologize" human relationships, so that we begin to define ourselves and others in terms of our DNA sequences?

Paabo worries about such possibilities. DNA studies have revealed how similar we are to other organisms, even such lowly creatures as worms and flies. These discoveries have emphasized the unity of life, Paabo says, but they also have been "a source of humility and a blow to the idea of human uniqueness." Paabo, like most scientists, is an optimist. He believes that genetic knowledge will strengthen our commitments to each other, not rob us of purpose. And studying how we evolved may reveal why human beings suffer from diseases not found in other animals. He is particularly insistent that studies of the evolutionary origins of speech will help children who have congenital speech problems.

But Paabo also says that the possible benefits of research are not his principal motivation. "I'm driven by curiosity," he says, "by asking the questions, where do we come from, and what were the important events in our history that made us who we are. I'm driven by exactly the same thing that makes an archaeologist go to Africa to look for the bones of our ancestors."

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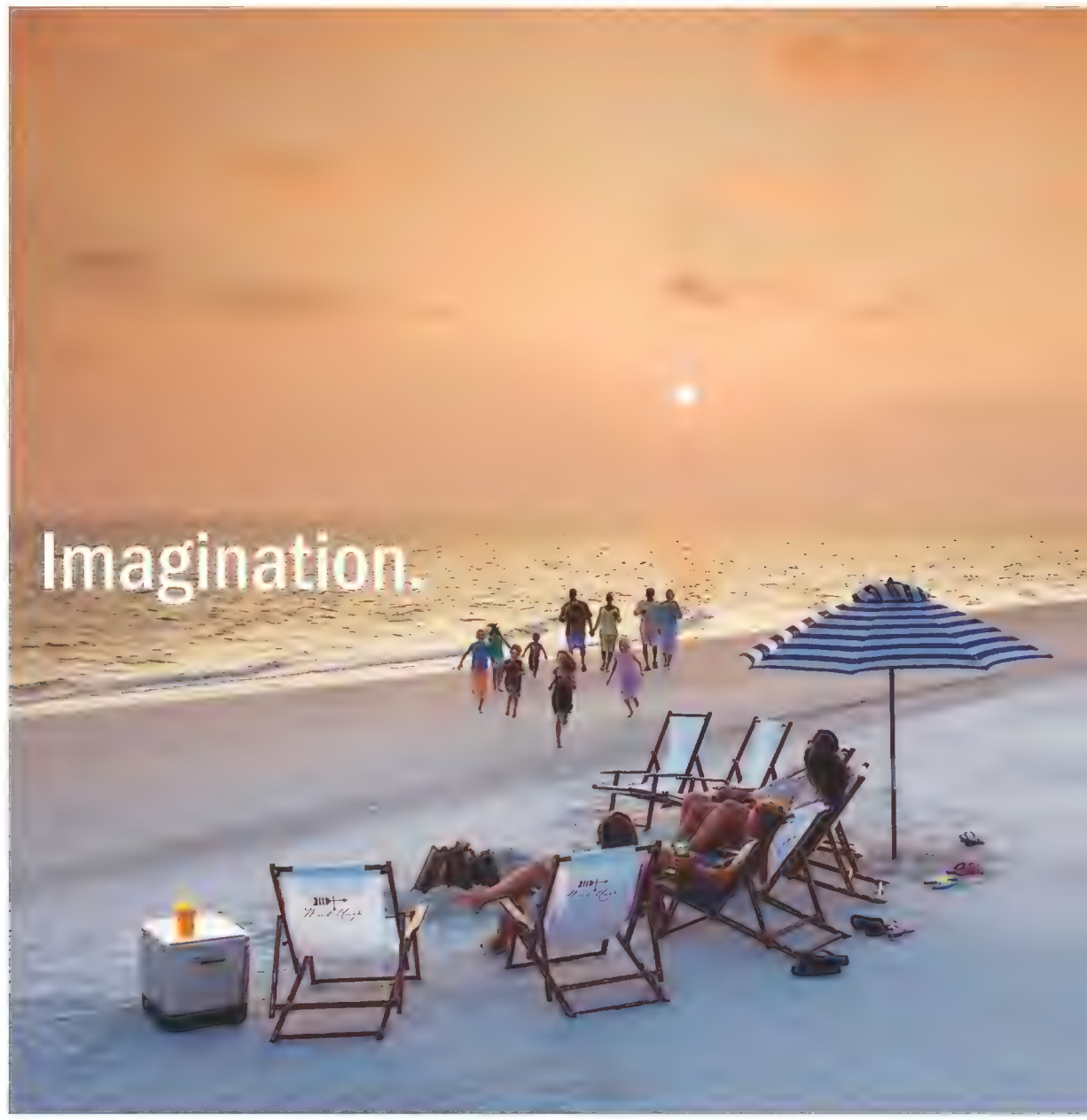

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Say What?

In an era of global communications, regional dialects are hanging in there, y'all

BY ULRICH BOSER
ILLUSTRATION BY ERIC HANSON

EXPERTS HAVE BEEN PREDICTING the imminent demise of American dialects for decades, arguing that universal literacy and mass media would deaden local speech patterns. No more "Hahvahd Yahd" in Boston or "goin' for a raad" in Birmingham. Everyone would sound as distinctly indistinct as a television newscaster.

But *The Atlas of North American English*, the first work to plot all the major speech patterns in the continental United States and Canada, has found the opposite: regional dialects are actually becoming more pronounced. In the Great Lakes region, "that" sounds more like "theeaht." Around New York City, people continue to drop their "r"s in everyday speech, saying "watta" instead of "water." Canadians are still apt to say "aboot" for "about."

North American English is a language of dialects because so many distinct groups settled the continent. Once an accented vowel is incorporated into a dialect, it typically strengthens over time. "It's a lot like a game of musical chairs—if you are going to the right, you keep on going to your right. If a dialect has a vowel that changes in one direction, it tends to keep on going in that direction," says University of Pennsylvania linguist Bill Labov, who compiled the new atlas with Charles Boberg and Sharon Ash.

Yet social forces may be even more important: people get their accents from friends and family and use them to help express their identity. While Canadians and Americans live within spitting distance of each other along the Michigan border, the word "stock" in Detroit sounds like "stack" in Windsor, Ontario. "Radio and television don't seem to have much impact on how people talk," Labov says. "People want to sound like their friends, their boss."

Labov and his team have amassed mountains of data on how dialects are changing, but a theory on *why* they change remains a challenge. "We develop these big trees that look like biological evolution, that show how one dialect died and another developed," says Labov. "But it's not really like biological evolution. No linguist believes that language gets better as it changes."

Visit Smithsonian.com to hear regional dialects.

"People want to sound like their friends, their boss," says linguist Bill Labov. To map the talk of the continent (above), he and colleagues Charles Boberg and Sharon Ash analyzed the speech patterns evident in telephone interviews with 762 subjects in 297 urbanized areas.

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CHARLESTON
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THE HAT

Sporting artist Alfred Munnings loved horses, the English countryside and a good stiff drink. What he didn't like was modern art

BY PETER CHEW

"YOUR ROYAL HIGHNESS, Your Excellencies, Your Graces, My Lords and Gentlemen, pray silence for the President of the Royal Academy of Arts, Sir Alfred Munnings." When Sir Alfred rose to address Britain's most influential arbiters of art that evening in 1949, he had reached the pinnacle of an amazing career, having risen from obscure provincial artist to general acceptance as one of the leading painters of his generation—and by far its most rambunctious.

He had become wealthy and famous, lionized on both sides of the Atlantic by Rothschilds and Astors and members of the royal family. His friends included Sir Winston Churchill, poet laureate John Masefield, high-ranking military, racehorse owners, trainers, masters of foxhounds and "staunch farmers of the right breed," as he put it.

His legacy endures. His early paintings of gypsy encampments, wild ponies and county fairs in long ago East Anglia are enjoying brisk sales, as are his later equestrian portraits and scenes of Thoroughbred racing at Newmar-

Munnings (below, in 1925, at age 47, at his home, Castle House) made abundant use of a young model, Shrimp (opposite, in yellow kerchief in *The Coming Storm*, 1910), "a wild, uncivilized primitive" who was a cunning predator of farmers' daughters.

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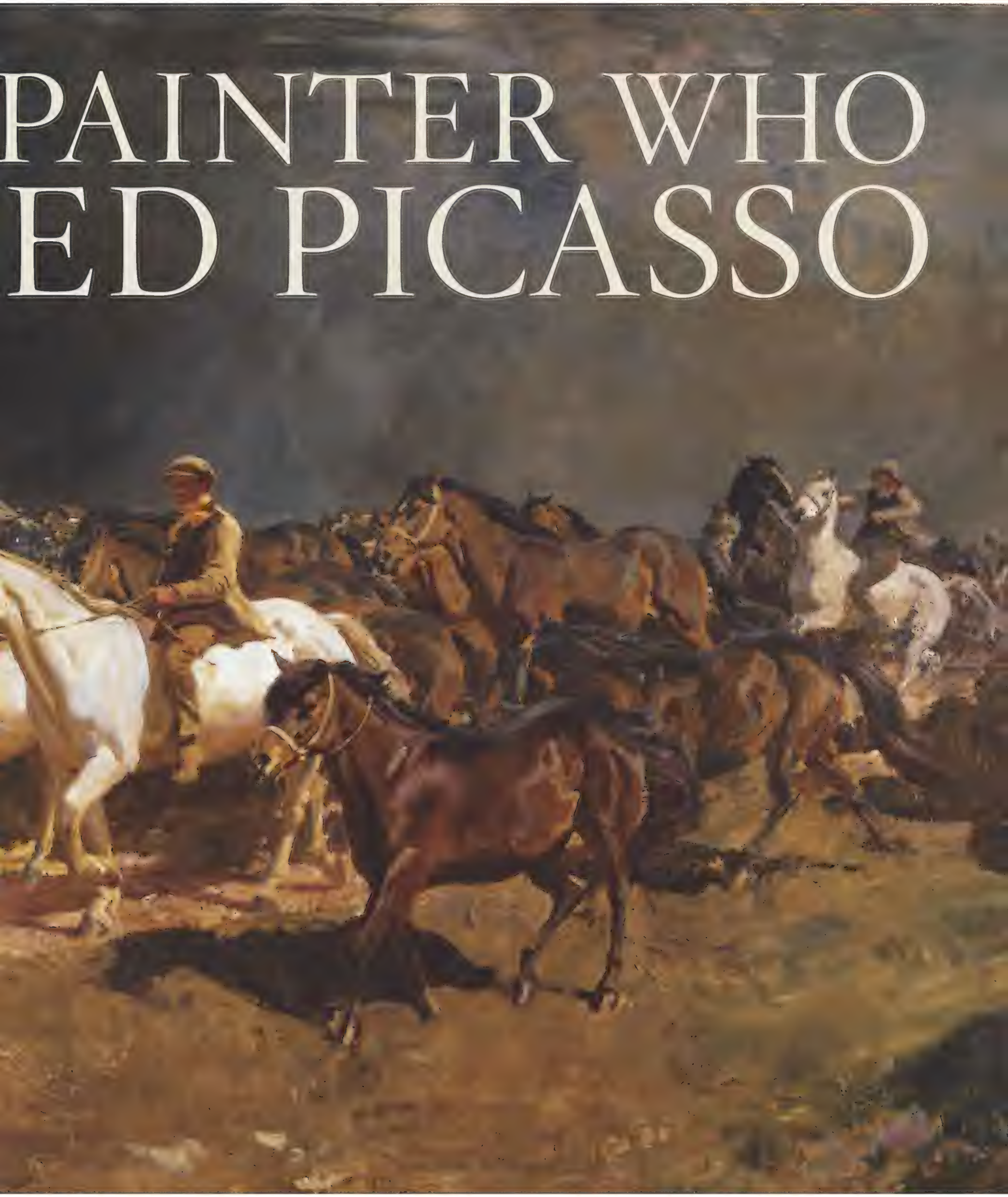

ket, Epsom and the like. Even though sporting art has often been treated with condescension by the art establishment, his works fetch prices in the millions, right up there with those of Francis Bacon, Lucian Freud and David Hockney. "There has been an incredible flowering of his followers as well as his prices," says Peter L. Villa, a Manhattan art dealer and former Christie's executive. "He has always been the leading light of English sporting art, a painter of great flair with a tremendous sense of the subject he was painting."

Munnings painted his second wife, Violet McBride (top), the daughter of a society riding instructor, in 1932-33, after they had been married a dozen years. He would recall in his autobiography that the scene depicted in *The Full River* (1931, above), near the couple's home in Dedham, "was our playground, and a reminder of my youth."

But Munnings' life was not all strawberries and clotted cream. Born the second of four sons to a miller in 1878, he lost the sight of his right eye just before his 21st birthday; from about age 30, gout had him in its grip, and his first wife tried to commit suicide on their honeymoon only to succeed two years later in 1914.

And in his autobiography, Munnings recounts the "chill" he felt when it dawned on him that "much that was beautiful in England was slipping away," a transition he lovingly documented. "He was completely besotted with the countryside of England and hated to see it change," says Munnings expert Lorian Peralta-Ramos. "It was heart-wrenching for him to see the horse replaced by the machine."

Of a piece with his distress over the loss of Arcadia was his obsessive hatred of modern art—with the exception of Impressionism, which he embraced in many of his paintings. He thoroughly enjoyed taking potshots at contemporaries Pablo Picasso and Henri Matisse, and he felt that few modern artists had paid their dues or even learned to draw.

"What are pictures for?" he asked. "To fill a man's soul with admiration and sheer joy, not to bewilder and daze him."

MUNNINGS' LIFE BEGAN in relatively humble circumstances, in the sleepy rural country along the Suffolk-Norfolk border, 75 miles northeast of London. At that time the horse was still central to humankind's existence. The animal had been celebrated in the brilliant equestrian paintings and lithographs of George Stubbs (1724-1806), whose work paved the way for Munnings. So too did the encouragement of his parents, who presented the boy with a toy horse at age 4. The artist would long remember its black mane and bobbing head, as he would his first pony—and every other horse he ever owned. In *An Artist's Life*, the first volume of Munnings' three-part memoir, he recalls a carriage ride with his father who shared his love of high-spirited horses: "It was then the grey mare. I can see her now as plainly as one of my own today. A fair-sized, well-bred mare, all quality

SIR ALFRED MUNNINGS MUSEUM, DEDHAM, ESSEX, UNITED KINGDOM / BRIDGEMAN ART LIBRARY; © HARRIS MUSEUM AND ART GALLERY, PRESTON, LANCASHIRE, UNITED KINGDOM / BRIDGEMAN ART LIBRARY; P. 86 HULTON ARCHIVE / GETTY IMAGES; PP. 86, 87 © ART GALLERY OF NEW SOUTH WALES, SYDNEY AUSTRALIA / BRIDGEMAN ART LIBRARY

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"What are pictures for?" Munnings once asked. "To fill a man's soul with admiration and sheer joy, not to bewilder and daze him." His early paintings (*A Gala Day*, 1902) featured farmers and villagers enjoying themselves at country fairs.

and with a temperament. I can see those pricked-up ears in front of us and the short, silky, silver mane in the breeze. I hear her hooves on the road, the jingle of the silver-mounted harness and the sound of the wheels as we bowled along."

With his three brothers, young Alfred spent his days roaming the meadows and playing along the Waveney River. But this idyllic childhood came abruptly to an end at age 14, when his father bound him to a six-year apprenticeship to Page Brothers & Co., Ltd., lithographers in Norwich, 20 miles from the Munnings home in Mendham. After each ten-hour workday, Alfred would walk to the Norwich School of Art to study until 9 p.m. For a restless, energetic young man it was a grinding, often boring regimen, softened only by the occasional bottle of cheap wine and the volume of Tennyson he kept beneath his desk.

Still, Munnings thrived under the pressure of turning out imaginative advertising illustrations on short notice for such accounts as Colman's Mustard, Waverley Cycles, and A. J. Caley & Son chocolate and cracker manufacturers. His work for Caley brought in so much business that John Shaw Tomkins, a company director, took Munnings under his wing.

In 1899, the 20-year-old artist was elected to the Royal Institute of Painters in Watercolour, and the Royal Academy of Arts accepted two of his paintings for display. In one, *Stranded*, a little girl in a blue pinafore and a boy struggle to free their rowboat from reeds along a riverbank. In the other, *Pike-fishing in January*, a lone angler stands by a stream, his collar turned up.

It's hard to overstate the importance of the Royal Academy of Arts, the prestigious society established by King George III in 1768 to compete with the French

Longtime SMITHSONIAN *contributor* **PETER CHEW**, *who died this past July at age 82, is remembered in "From the Editor" on page 14.*

"I saw the thoroughbred horses and jockeys in bright silk colours going off down the course" (*Under Starter's Orders. Newmarket Start, Cries of 'No, No, Sir,'* 1957), Munnings would write in his autobiography, ". . . and I began to *live*!"

salon. Sir Joshua Reynolds was appointed first president, with membership then restricted to 40 academicians and 20 associates. Munnings celebrated his academy acceptance by going into his beloved English countryside with a friend for a hunt race meeting. "I saw the thoroughbred horses and jockeys in bright silk colours going off down the course," he later wrote. "The peaceful School of Art, the smelly artists' room at Page Brothers faded away, and I began to *live*!"

Not much later, his apprenticeship over, Munnings began the perilous business of making a living as an artist. It was around this time that he suffered a disaster: while lifting a puppy over a thorn barrier, a branch rebounded and a thorn pierced his right eye, blinding it. He spent six months in a Norwich nursing home with both eyes bandaged and his savings evaporating. When the bandages at last came off, he had trouble with depth perception and gauging distances, problems that would bother him the rest of his life.

To ease his way back into solvency, Munnings' mentor and first patron, Tomkins, gave him commercial assignments. Munnings also unapologetically sought solace in the bottle. He describes, with genuine affection, a particularly lethal punch made from an 18th-century recipe consisting of rum, brandy, sherry, lemons, sugar and cloves, which was "never known to fail in making a night."

SIR ALFRED MUNNINGS MUSEUM, DEDHAM, ESSEX, UNITED KINGDOM / FELIX ROSENTIEL'S WIDOW AND SON LTD.

In 1904 he moved to Swainsthorpe, five miles south of Norwich, where he rented rooms and a studio in a farmhouse. There he assembled a band of ponies, horses and a donkey to serve as models. He bought a blue caravan with a stovepipe peeking out of the roof and a flatbed cart to carry a tent, a big umbrella, an easel, oil paints, canvases, turpentine, brushes, piles of paint rags, as well as watercolor materials.

He acquired the most picturesque of his human models—a youth nicknamed Shrimp. This young gypsy, "a wild, uncivilized primitive," also helped with the animals and baggage, but caused Munnings many a headache. Shrimp could neither read nor write; he drank too much; fell into minor scrapes with the law; and proved a cunning predator of farmers' daughters along the fields and down the tranquil lanes of Norfolk and Suffolk. But Shrimp was also indispensable. Munnings had him fit out with corduroy trousers, and a black waistcoat, yellow kerchief and soft cap. Thus caparisoned, he appears in many early Munnings works, including one in which Shrimp whips a thundering herd of ponies up and over a stream bank; *Coming Through the Gap*, as it is called, brought $2,274,000 at a Christie's auction of 21 works in June 2002 that brought more than $8.5 million.

The years from about 1900 to 1914, encompassing the Edwardian era, were among the artist's most creative. He produced wonderfully atmospheric pictures of farmers and villagers gossiping and otherwise enjoying themselves at horse fairs and country race meetings. These were his people; the Munnings clan had been living in these parts, close to the soil, since the Battle of Agincourt in 1415.

In the summer of 1910, Munnings fell in love with Cornwall, in southwest England, with its stone-walled dairy farms, spectacular cliffs, pounding surf and cry of sea gulls. Late one December afternoon at a spot along the coast, the artist was out with the hunt when a fox eluded the hounds and bounded down a cliff. When the riders dismounted and peered below, they saw the fox crouching on a boulder at the edge of the booming surf. Munnings and the whipper-in (identified only as "Jack") made their way down the cliff. Jack cracked his whip at the fox, which plunged into the water with a terrified yelp and was immediately fighting for its life.

In his memoirs, Munnings recalls that the current repeatedly carried the rapidly tiring fox just short of the rocks, only to drag him back to sea. At what must have been the fox's last chance, a huge wave lifted him ashore. He shook himself, scrambled up the cliff and disappeared into a crevice. Jack started after him, but Munnings stopped him. The professional hunt staff was furious, but members of the hunt field cheered. Munnings' rendering of the episode, *Gone to Cliff*, fetched $2,426,000 at auction in June 2001.

Sir Alfred's last days in Cornwall were spent in the looming shadow of World War I. Munnings found some of the young artists there less interested in painting than partying, which they did Roman-style, sipping wine and nibbling grapes on floor cushions. The army turned Munnings down because of his blind eye, but he was able to wangle a civilian job outside of Reading in 1917, processing tens of thousands of Canadian horses en route to France—and often death. Nearly 500,000 British horses alone perished in World War I. After about a year, Munnings became an official war artist attached to the Canadian Cavalry Brigade under the command of British general J.E.B. "Jack" Seely.

On a bitter cold January morning in 1918, in a shell-blasted landscape on the Western Front, a few thousand yards from the German lines, Munnings painted a portrait of General Seely and Warrior, his charger. Later, when General Seely's unit was forced into a galloping retreat, the artist discovered what it was like to come under shellfire.

When he returned to his old life in London in the summer of 1918, it was like Murphy's Law turned on its head: everything that could go right professionally for the 40-year-old artist did go right. A pair of canny Scottish art dealers bought up most of his prewar paintings, helping to make him financially secure. He leased his first apartment and studio in London and in 1919, bought Castle House in Dedham, Suffolk, in the "Constable country" along the Suffolk-Essex border, famed for its big sky and gnarled oaks and so-called in tribute to the great landscape artist John Constable (1776-1837), whom Munnings hugely admired. His 1919 London exhibition of 45 paintings of the Canadians in France was a smashing success, and he was in even greater demand after Princess Alice commissioned him to paint her husband, the Earl of Athlone. Munnings posed him in uniform, aboard his horse against a faux battlefield on the grounds of Windsor Castle.

In 1920, Munnings married Violet McBride, a young widow and a top show ring rider, the daughter of a society riding instructor. Her social connections were doubtless helpful. She had a shrewd head for business and handled their finances skillfully. The Munnings were often apart for long stretches while he traveled and she hunted foxes.

At Munnings' favorite racetrack, historic Newmarket, he produced a series of paintings showing horses plunging, rearing and milling about at the start in what Edgar Degas reportedly once called a state of "naked tension."

He painted paddock scenes before the races and winner's circle scenes after, but in only a few instances did he portray the race itself. He loved horse racing—but lamented any exploitation of the animals. He went on shooting parties—but never carried a gun. His war paintings omitted any carnage.

From the 1920s until his death in 1959, Munnings could count upon a steady stream of rich commissions. From time to time, though, he threatened to quit work-for-hire and concentrate upon subjects of his own choosing, especially country life and landscapes. But his wife kept his hand to the easel, reminding him of their overhead which, at one point, included taking care of more than 30 horses, a country hunting cottage, their London properties, his London clubs and other manifestations of the good life.

Munnings was sometimes gone for months at a time living among the wealthiest people in the world. That life had its benefits. Munnings writes of sketching a mare and foal in an elm-shaded paddock at Anthony de Rothschild's Southcourt Stud near Leighton Buzzard in the early 1920s. In those days a groom appeared daily at teatime with a silver service, placing it on the grass beside the artist with a word of encouragement. "There, sir, that should help you to keep going."

But Munnings also found that life in the rarefied air among patrons could be lonely. "You are a guest but you are really not their friend," observes Peralta-Ramos. "You are a servant but you are not a servant. It's a very awkward situation." To his credit, Munnings did not try to soften his Suffolk accent or change his salty language or his raffish style of dress. He was who he was. But he became more opinionated as the years rolled by, which also aggravated his obsessions about Picasso and what one critic called the Spaniard's "queer distortions."

"If he didn't agree with you, he'd let you know it and was not going to smile politely and let you get away with a silly comment," says Peralta-Ramos. He attracted fierce supporters and equally avid detractors.

"As those artists whom he criticized became more popular, it was the critic, not the artists, who suffered," says Duncan Robinson of the Fitzwilliam Museum in Cambridge. "He lost some battles. But he was a fighter, old Munnings."

In 1932, philanthropist Paul Mellon asked Munnings to paint him astride his favorite hunter, Dublin, in Gloucestershire. In his *Reflections in a Silver Spoon*, Mellon recalls getting a photograph of the painting before the real thing arrived. "I thought the bushy willow tree to the left was a little disturbing and wrote to Munnings, asking whether he could do something to make it slightly less prominent," Mellon recalled. "Sometime later, I got a blast back saying in the first place, the tree wasn't a willow, it was a pollarded oak, and second, he had no intention of changing anything whatsoever. So that was that."

{ CONTINUED ON PAGE 94 }

Though Munnings enjoyed the trappings of wealth (below, *Tagg's Island*, 1919), he sometimes found life among his rich patrons trying. And, says Munnings expert Lorian Peralta-Ramos, "If he didn't agree with you, he'd let you know it."

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By the time Munnings (above, in 1954) spoke at the Royal Academy dinner, he had apparently consumed a great deal of sherry. He told the distinguished audience he would rather paint "a damned bad failure . . . than all this affected juggling."

Neither man could have imagined that Mellon, then 25, would one day become one of the greatest supporters of sporting art and the biggest collector of Munnings' work.

From those in love with horses, Sir Alfred's work often elicits strong emotions. After World War I, for example, he visited General Seely (by then, Lord Mottistone) at his farm on the Isle of Wight and again sketched the general's war horse. In *My Horse, Warrior*, below the sketch, the general wrote: "Here is Warrior's head as drawn by my friend Munnings. The likeness is so striking, the expression so true, that I confess it moves me deeply. It is Warrior that I see, the real Warrior with his white star and his fearless eye."

After lunching one day at Chartwell with Winston Churchill, Munnings encouraged the artistic efforts of England's most famous amateur and saw to it that the Royal Academy elected him a "member in extraordinary." Sir Winston, in turn, encouraged Sir Alfred to resume the academy's annual banquets at Burlington House, which had been suspended since the war. Though Munnings wanted to quit the presidency—he found it irksome and time-consuming—he agreed to stay on through 1949 and to hold a farewell banquet. Both men were determined that Munnings' swan song would not be a stuffy affair.

BBC Radio would cover the event. Munnings borrowed the toastmaster from the office of the Lord Mayor of London, and signed up the Royal Artillery band to play "The Boys of the Old Brigade." The distinguished white tie assemblage included Viscount Montgomery of Alamein; the Archbishop of Canterbury; and Anthony Blunt, Surveyor of the King's pictures, later to be convicted of spying for the Soviet Union. Munnings despised Blunt, for he had once heard him say that Picasso was a greater painter than Sir Joshua Reynolds.

By the time it was Munnings' turn to speak, he had apparently consumed a great deal of sherry, followed by several toasts with champagne. Soon he was having trouble getting past words like "innumerable," but his message was clear and heartfelt. "I find myself a president of a body of men who are what I call shilly-shallying. They feel there is something in this so-called modern art. . . . Well, I myself would rather have—excuse me, my Lord Archbishop—a damned bad failure, a bad, muddy old picture where somebody has tried . . . to set down what they have seen than all this affected juggling. . . . Not so long ago I spoke in this room to the students, and. . . . I said to those students, 'if you paint a tree, for God's sake try and make it look like a tree, and if you paint a sky, try and make it look like a sky. . . . '"

He might as well have rolled a grenade down the banquet table. There were shouts of "hear, hear," angry interruptions and outbursts of laughter. Munnings bristled: "As I am president and have the right of the chair, allow me to speak. I shall not be here next year, thank God!"

The next morning, phone calls and cables poured into the academy and the BBC, followed by hundreds of letters, the great majority of which, Munnings insisted, supported him. Cartoonists had fun with the war of brush and palette. David Low, of the *Evening Standard*, depicted Munnings leading a cavalry charge up the steps of the Tate Gallery. The caption read: "General Munnings's lowbrow cavalry charges the Tate Gallery. Picasso taken prisoner! Matisse severely wounded!"

"Munnings stood for everything that was reactionary in that speech when, in fact, he wasn't as reactionary as perhaps he thought he was," says Malcolm Cormack, the former Paul Mellon Curator of the Virginia Museum of Fine Arts in Richmond. "He owed a great deal to Impressionism. You can't think of Munnings without seeing those wonderful impressionist landscapes that he did."

Toward the end of his life, Sir Alfred's left eye was beginning to fail him along with his general health. He died in his sleep in the early hours of July 17, 1959. He was 80. His ashes were placed in the crypt of St. Paul's Cathedral beside those of John Constable. Poet John Masefield's inscription on Sir Alfred's memorial plaque reads:

O friend, how lovely are the things,
the English things, you help us to perceive.

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300 Million and Counting

The United States reaches a demographic milestone, thanks largely to immigration **BY JOEL GARREAU**

PEOPLE IN THE demographics business like to think of themselves as the only futurists you can trust. They've got a point: if you want to know how many 21-year-olds there will be in 2027, just count the number of infants living today. Absent a catastrophe of biblical proportions, you'll come up with a pretty good prediction.

What demographers admit they're not so good at is anticipating change. (For example, they were terrible at projecting the impact of birth control.) At the height of the "population explosion" hysteria four decades ago, few believed that birthrates could fall so far and so fast that the population of a major country like Russia would actually start shrinking (as it did about 14 years ago). Germany's tipping point seems to have arrived in 2002, and Japan's in 2005.

So what are we to make of the moment, projected by the U.S. Census Bureau to arrive this month, when the population of the United States reaches 300 million, behind only that of China and India? Demographics is simply the arithmetic of culture and values—it only quantifies, it doesn't explain. Is 300 million a good thing? A bad thing? Thinking about that number provides an opportunity to talk about where we're headed and what makes us tick.

Readers who remember November 20, 1967, when the population of the United States passed 200 million, may recall the predictions of Paul R. Ehrlich. In *The Population*

CHARLIE NEIBERGALL / AP PHOTO

The U.S. ranks third in the world in population, behind China and India. But as the total number of people on the planet increases, demographers are focusing on problems that stem from a shrinking population in surprisingly large swaths of the developed world.

Bomb, in 1968, he foretold "certain" mass starvation by 1975 because of population growth. "The battle to feed all of humanity is over," Ehrlich's first sentence read. "In the 1970s and 1980s hundreds of millions of people will starve to death in spite of any crash programs," he declared. At best, North America and Europe would have to undergo "mild" food rationing within the decade as starvation and riots swept across Asia, Latin America, Africa and the Arab countries; at worst, the turmoil in a foodless Third World would set off a series of international crises leading to thermonuclear war.

Of course, things didn't quite work out that way. The problem in the United States is obesity. Even in places like Somalia and Sudan, famines have been intractable not because of any global lack of food, but because the food has not gotten to the people who need it—too often because corrupt regimes have withheld it as a means of political control. Nonetheless, Ehrlich's misjudgment sold more than three million copies, and the phrase "population bomb" entered the vocabulary.

That's why some people find it hard to wrap their minds around the big news in demographic circles today. It's not catastrophic population growth. It's catastrophic population *shrinkage*.

Yes, shrinkage. True, the total global population has not yet finished increasing. But nearly half the world's population lives in countries where the native-born are not reproducing fast enough to replace themselves. This is true in Western Europe, Eastern Europe, Russia, Japan, Canada and the United States. It's also true in much of East Asia, pockets of Latin America and such Indian megacities as New Delhi, Mumbai (Bombay), Kolkata (Calcutta) and Chennai (Madras). Even China is reproducing at levels that fall short of replacement.

Typically, a couple has to produce about 2.1 children to replace themselves, allowing for death among the young. Even in traditionally Catholic countries in Europe, the birthrate has dropped to shockingly low levels in the

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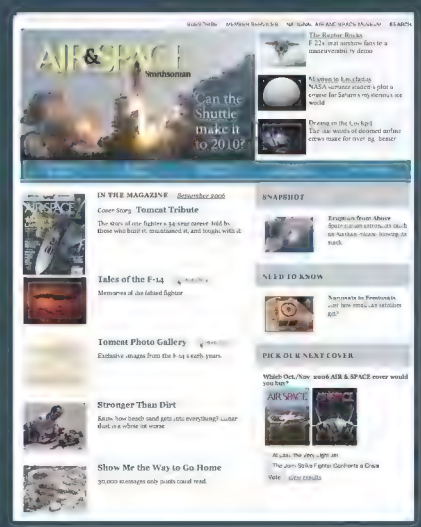

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last two generations: 1.3 in both Italy and Spain in 2005. In metropolitan Tokyo, the rate dropped to 0.98. In Hong Kong and Macau, it hit 0.96 and a hitherto unthinkable 0.84, respectively, the latter the lowest on record. Few demographers ever dreamed that in the absence of war, famine and pestilence—in fact, as a result of urbanization, development and education—birthrates would drop so dramatically. No one knows where the bottom is. Keep this up, and eventually your civilization will disappear.

The United States' population is growing at the rate of almost 1 percent per year, thanks in part to immigration and its secondary effects. Not only does the United States accept more legal immigrants as permanent residents than the rest of the world combined, but these recent arrivals tend to have more children than established residents—until, as their descendants attain affluence and education, the birthrates of these Americans also drop below replacement levels. Overall—that is, counting both immigrants and the native-born—the United States has a replacement rate of 2.03.

Nearly half of the nation's children under 5 belong to a racial or ethnic minority. The face of the future is already in our schools: our kindergartens now prefigure the country as a whole, circa 2050—a place where non-Hispanic whites are a slight majority. High-achieving school systems are already adapting: in Fairfax County, Virginia, for example, where 93 percent of all high-school graduates go on to post-secondary education, programs that teach English as a second language accommodate more than 100 native tongues, including more than five flavors of Chinese.

Few Americans quarrel with the idea of legal immigration. Not only is it part of the national narrative, but we're especially delighted when these immigrants help create companies such as Intel, eBay and Google. Of course large numbers of people showing up without paperwork stirs passions, as attested to this year by the rise

of the Minuteman Project of civilians patrolling the border with Mexico, the deployment of National Guard troops to do the same, the protracted debate over immigration bills in Congress and the stark demonstrations related to the legislation.

However that debate is resolved, it's probably worth noting a few historical assimilation practices in the United States. First, this country has a long and distinguished record of taking illiterate peasants from every desert, tundra and bog and turning them into overfed suburbanites in three generations or less. Second, new immigrants usually do not marry outside their ethnic group; their adult children do, with some controversy, and their adult grandchildren can't remember what the fuss was all about. Finally, the traditional deal America has offered immigrants is: work, pay taxes, learn English, send your kids to school and stay out of trouble with the law, and we'll pretty much leave you alone.

PETER TURNLEY / CORBIS

Many developed nations face challenges in caring for aging populations, but Russia's problem "looks to be worse than the sum of its parts," says one political economist.

One fortuitous result of the enormous wave of immigrants coming to the United States is that the median age here is only a little over 35, one of the lowest among the world's more developed countries. This country also has the most productive population per person of any country on the planet—no matter how you measure it, and especially compared with Japan and the members of the European Union.

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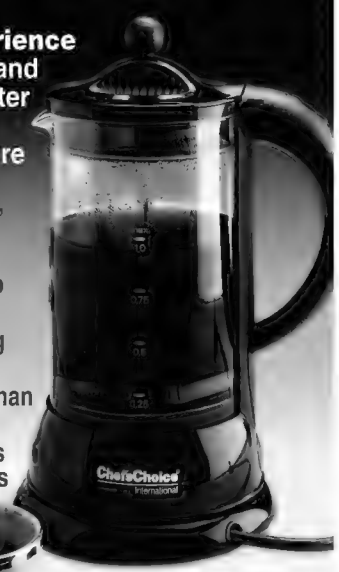

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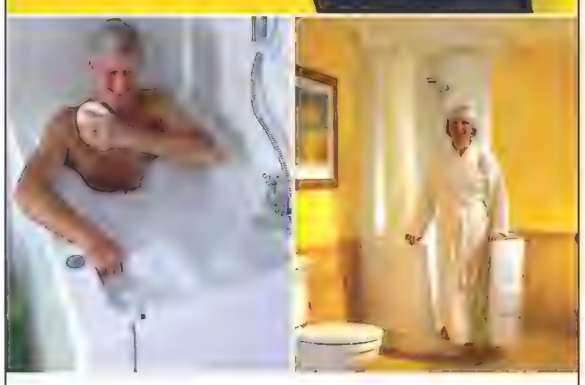

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your investments, there is no alternative. As it happens, retirement is on the minds of many, and not just in the United States.

TODAY, virtually every developed country's population is older, typically, than that of just about every human society before 1950.

Much has been written about how hard it's going to be for European countries and Japan to support their aging populations at the generous level of social services to which previous generations have become accustomed. But global graying offers an even more formidable challenge to less wealthy countries.

By 2025, according to the United Nations and the U.S. Census Bureau, China will account for less than a fifth of the world's population, but almost a fourth of the world's people over 65, many of them in China's poorest areas. That means that in less than 20 years, large parts of China will have to support very aged populations on very low average incomes.

This is a problem Americans should be grateful they don't have, for all sorts of reasons.

First, China's version of Social Security is a colossal mess, even by the standards of the American and European systems. It covers only about a sixth of all workers. Its unfunded liabilities appear to exceed the country's total gross national product—maybe by a lot.

Second, the ages-old Chinese practice of adult children supporting their parents is coming undone. Traditionally, that obligation has passed through males; daughters are supposed to help support their husbands' parents before seeing to their own. But there's a problem here: because of Chinese population control, a woman turning 60 in 2025 will likely have had fewer than two children in her lifetime, and the odds are about one in three that she will not have borne a son.

If you're old and poor and you can't rely on either your government or your grown children for support, you have to keep working. In China, this does

not mean greeting customers at Wal-Mart, much less answering the technical support line at Dell. Many of China's elderly barely have a primary school education, live in rural areas and haven't had the food and health care that would allow them to be vigorous in their old age. Nonetheless, the only work available to them is farming, which without mechanized tools is a tough row to hoe.

It's not a pretty future. Even if China's economy continues to grow by 8 percent per year, every year, for two decades—a scenario that is difficult to construct—the older generation is in big trouble. "China's outlook for population aging," political economist Nicholas Eberstadt writes, is "a slow-motion humanitarian tragedy already underway."

But not even China is as bad off as Russia. Americans talk about age 40 being the new 30 and 80 being the new 60, but in Russia, 30 is the new 40. Since the 1960s, just about each new generation of Russians has become more fragile than the one that preceded it. Every year, 700,000 more Russians die than are born.

"Pronounced long-term deterioration of public health in an industrialized society during peacetime is a highly anomalous, indeed counterintuitive proposition for the modern sensibility," Eberstadt writes. "Nevertheless, over the four decades between 1961-62 and 2003, life expectancy at birth in Russia fell by nearly five years for males." What's more, he notes, this increased mortality was concentrated among working-age men: "Between 1970-71 and 2003, for example, *every* female cohort between the ages of 25 and 59 suffered *at least* a 40 percent increase in death rates; for men between the ages of 30 and 64, the corresponding figures uniformly exceeded 50 percent, and some cases exceeded *80 percent*."

Demographers and public health specialists are at a loss to explain these awful numbers, though such obvious factors as diet, smoking, drinking and sedentary lifestyles certainly enter in. One mystery in the "ongoing Russian

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The Netherlands, like other European countries, has a low native birthrate, and it has difficulty assimilating immigrants.

BERT SPIERTZ / ARABIAN EYE / REDUX

health disaster," Eberstadt adds, "is that the problem looks to be worse than the sum of its parts: that is to say, death rates are significantly higher than one would predict on the basis of observed risk factors alone."

Whatever the answer, the future is grim: a Russian man has barely a fifty-fifty chance of making it to age 65 while, in the developed world, the over-80s make up the fastest-growing portion of the population.

Are you feeling any more comfortable with America's healthier, younger 300 million by now? Wait, there's more.

At the rate ethnic Germans are not reproducing, they will probably lose the equivalent of the entire population of the former East Germany by mid-century. Who will fill up the rest of the country? Immigrants from Muslim countries is the odds-on bet. But as last year's riots in France and subway bombings in England demonstrate, Europe is not having a lot of luck assimilating its immigrants. In the Netherlands, for example, where nationality is based on ancient ties to family or land, concepts that seem unremarkable in North America—such as "Moroccan-Americans" or "Moroccan-Canadians"—simply have no meaning. The Dutch language offers two words: *autochtonen* ("us") and *allochtonen* ("them"); the Dutch people are still working to find ways to incorporate the latter into the former.

AND YET: just about the time you start feeling comparatively good about living in a nice, young, healthy, assimilationist United States, you get smacked upside the head by the mind-boggling and peculiarly American problems this country's growth creates.

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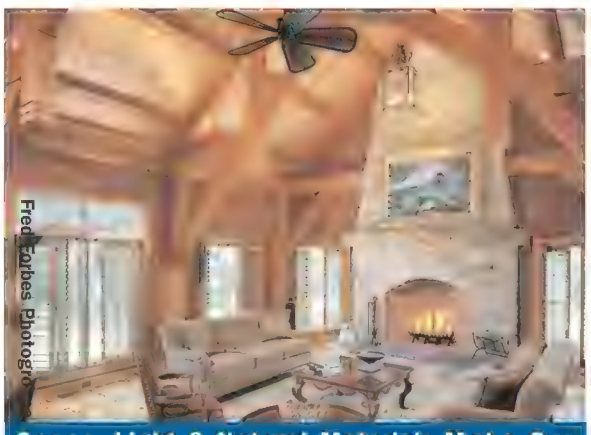

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What are the morals of these recitations?

Two leap to mind.

The first is, whenever you start thinking that this country is screwed up beyond redemption, it pays to travel beyond our borders. It's amazing how often the not-so-wonderful realities that we think of as terrible problems constitute other people's dreams.

The second is, demographics may not be destiny. But the numerical study of who we are and how we got that way does have a refreshing habit of focusing our attention on what's important, long-term, about our culture and values—where we're headed, and what makes us tick.

JOEL GARREAU *has written three books on culture and values and served as a senior fellow at George Mason University and the University of California at Berkeley.*

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New Product Update

Bone Health Breakthrough!

NEW!

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"If your doctor told you not to take **Fosamax®** *or* **Boniva®** *because of possible side effects... don't be discouraged..."*

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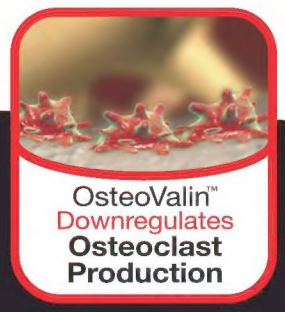

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While not conclusive, scientific evidence suggests that OsteoValin may help the body reduce bone deterioration and build new bone mass through natural downregulation of osteoclast production and upregulation of osteoblast activity.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

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Cosmetic Breakthrough

Better than Botox®*?

"The Stretch-Mark Cream Turned Anti-Wrinkle Phenomenon!"

In a remarkable turn of events, arguably one of the strangest in the history of cosmetics, women across the country are putting a stretch-mark cream called StriVectin-SD® on their face to diminish the appearance of fine lines, wrinkles, and crows' feet. And, if consumer sales are any indication of a product's effectiveness, StriVectin-SD is nothing short of a miracle. Women (as well as a growing number of "Boomer" men) are buying so much StriVectin-SD that finding a tube at your local cosmetic counter has become just about impossible. Has everyone gone mad? Well… not really.

Scientific Breakthrough or Dumb Luck?

Although StriVectin-SD's functional components were already backed by clinical trials documenting their ability to visibly reduce the appearance of existing stretch marks (prominent because of their depth, length, discoloration, and texture)… the success of StriVectin-SD as an anti-wrinkle cream was "dumb luck," says Gina Gay, spokesperson for Klein-Becker, maker of StriVectin-SD.

"When we first handed out samples of the StriVectin formula to employees and customers as part of our market research, the sample tubes were simply marked 'topical cream' with the lot number underneath," Ms. Gay explains. "As the samples were passed to friends and family, the message became a little muddled and some people used this 'topical cream' as a facial moisturizer. As we began to receive feedback from users, like 'I look 10 years younger' and 'I can't even notice my crows' feet,' we knew we had something more than America's most effective stretch-mark cream. The point was driven home as store owners began reporting that almost as many people were purchasing StriVectin as an anti-wrinkle cream as were buying it to reduce stretch marks."

Dr. Daniel B. Mowrey, PhD, Klein-Becker's Director of Scientific Affairs, says, "Clearly, people were seeing results, but we didn't have a scientific explanation as to why this wrinkle reduction was occurring. However, based on the incredibly positive reports, I started using it myself — applying StriVectin to my face after shaving." Dr. Mowrey adds, "On a personal note, my wife tells me I haven't looked this good in years."

Dumb Luck Strikes Again!

Then, on Tuesday, July 2, 2002, at a meeting of the 20th World Congress of Dermatology in Paris, France, a series of studies detailing the superior wrinkle-reducing properties of a patented oligo-peptide (called Pal-KTTKS) versus retinol, vitamin C, and placebo, on "photo-aged skin" was presented.[1,2] "As luck would have it," Dr. Mowrey states, "the anti-wrinkle oligo-peptide tested in the breakthrough clinical trials turned out to be a key ingredient in the StriVectin cream."

In the trials, subjects applied the patented peptide solution to the crows' feet area on one side of the face, and a cream containing either retinol, vitamin C, or a placebo to the other side.

Subjects in the Pal-KTTKS/retinol study applied the cream once a day for 2 months and then twice a day for the next 2 months. Using special image analysis, the study's authors reported "significant improvement" in the appearance of both overall skin tone and unsightly wrinkles for those women using the peptide solution.

Better yet, at the 2-month halfway point, the peptide solution worked nearly 1.5 times faster than retinol (in measured parameters), and without the inflammation retinol often causes in sensitive skin. As was expected, the results of the remaining studies confirmed that the Pal-KTTKS solution's effectiveness at reducing the appearance of fine lines and wrinkles far exceeded both vitamin C and placebo.

A smoother, younger complexion, with less irritation and faster results — all without expensive (and painful) peels, implants, or injections.

Better than Retinol and Vitamin C, But Is StriVectin-SD® Better than Botox®*?

Dr. Nathalie Chevreau, PhD, RD, Director of Women's Health at Salt Lake City based Basic Research®, exclusive distributor for Klein-Becker, explains, "Leading dermatologists agree that Botox Cosmetic is the preferred treatment for glabellar lines, that tiny little space of moderate to severe lines between the eyebrows. But ever since it was discovered that StriVectin could reduce the appearance of fine lines, wrinkles, and crows' feet… the kind of fine lines, wrinkles, and crows' feet that can add 10-15 years to your appearance and which costly medical treatments often leave behind… skin-care professionals have been recommending, and using, StriVectin." In fact, researchers believe non-invasive alternatives are better, because, Dr. Chevreau continues, "Topical creams and gels offer gradual, continual results, while the effects of injections, facial peels, and dermabrasions are rougher on the skin and wear off."

In other words, StriVectin-SD helps give you a youthful, healthy, glowing complexion faster than retinol, far superior to vitamin C, and without irritation, needles, or surgery. Even better, many dermatologists and plastic surgeons recommend StriVectin in conjunction with cosmetic procedures, including Botox.

So, if you see someone applying an anti-stretch mark cream to their face, don't think they've gone off the deep end… they may be smarter than you think.

Having a hard time finding StriVectin-SD®?

If you've been searching for StriVectin-SD, you already know it's become almost impossible to find. Don't bother with Neiman Marcus, they don't have it… Your best bets are ☆macy's way to shop, SEPHORA shops, PARISIAN, Lord & Taylor, bloomingdale's, or Saks 5th Avenue (they always try to keep it in stock) or, believe it or not, the pregnancy section of your local GNC or high-end supplement retailer. To be absolutely sure, you can order StriVectin-SD directly from Klein-Becker at:

1-800-285-7481
or order online at
www.StriVectin.com.

Since StriVectin-SD was designed as a stretch-mark cream, it comes in a large, 6-ounce tube. At $135.00, StriVectin-SD is not cheap… but when used as a wrinkle cream, one tube will last approximately six months. By the way, StriVectin-SD is backed by Klein-Becker's money-back guarantee. If StriVectin-SD doesn't make your skin look younger, healthier, and more vibrant, simply return the unused portion within 30 days for a full refund… no questions asked.

Call 1-800-285-7481
or order online at
www.StriVectin.com.

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* Botox® is a registered trademark of Allergan, Inc. The only indication approved by the FDA for Botox Cosmetic use is as follows: "BOTOX® COSMETIC is indicated for the temporary improvement in the appearance of moderate to severe glabellar lines associated with corrugator and/or procerus muscle activity in adult patients ≤ 65 years of age."

Study References:

[1] PO438 "Relevance of antiwrinkle treatment of a peptide: 4 months clinical double blind study vs excipient." 20th World Congress of Dermatology (60 subjects, 4 mos.)
[2] PO179 "Pentapeptide offers improvement in human photoaged facial skin." 20th World Congress of Dermatology (204 subjects, 14 weeks)

Moonstruck

You can't believe everything you think **BY MELODY VON SMITH**

I WENT TO A PARTY A WHILE AGO. In the course of otherwise reasonable conversation, one of the guests said, "Oh, everybody knows the moon landings were faked."

I started laughing at what I assumed was sarcasm—maybe a riff on NASA's recent announcement that it had lost some high-quality videotape of the first one. Then I saw from the expression on his face that he was serious. And a number of other guests were nodding in agreement.

Both my parents are scientists—analytical chemistry and molecular biology. I have a physicist uncle, and I am a chemist. The notion of faked moon landings was an affront to the family crest.

"Excuse me?" I said.

"The pictures are all perfect," he said.

"Because there is no air," I replied. "Which means no dust, so that distant objects on the moon still appear crisp."

"But they're perfectly focused."

"The published ones are perfectly focused, sure. Nobody wants to see the astronaut's thumb."

His eyes narrowed. "The flag is flapping. How is that possible when there's no wind?"

"It's not flapping," I said. "It's unfurling. Well, not unfurling, but that's the point—it was folded during the flight, and it didn't unfold fully even after they hung from the flagpole."

"OK, maybe. But those supposed moon rocks"—he did that annoying curly-finger quote thing—"could have easily been faked in a lab somewhere on earth."

"There's no water in them," I said."Nor do they have compositions that are commonly found on earth."

"But you could make them," he insisted. "In a lab."

I clenched my teeth. "It would take less research to just go get them from the actual moon!"

His nostrils flared. He was coming in for the kill now. "What about . . . radiation! People can't go through the Van Halen belts. They'd be fried."

"Van Allen belts."

"Whatever."

"The Apollo traveled through the Van Allen belts in less than an hour. It would take far longer than that for the exposure to affect them."

I launched into a lecture on relative dosage, my area of expertise. But I didn't stop there. In my fury, my three semesters of college physics resurfaced. I shoved the snack plates out of the way and positioned an olive centrally in the cleared space.

"This is earth," I growled. I snatched four cheese puffs, to represent the inner and outer Van Allen radiation belts, then grabbed some Twizzlers and modeled the solar wind and the earth's magnetosphere and the bow shock region.

I started spewing mathematical formulas, not because it was crucial to my argument but to intimidate. "Do you understand?" I finally demanded.

He shrugged. "I'm a biologist."

Finally, my coup de grâce: "The Russians."

He knit his brow.

"They had the first satellite, the first man in space, the first spacewalk," I said. "Then America gets the first man on the moon? That's like getting tripped by the other team's mascot. But have the Russians ever said the moon landing was a hoax?"

From now on I will start with this question. He backed away, admitting that perhaps—just maybe—I had a point.

The moral? There are several. 1. Just because you don't understand something doesn't mean it isn't true. 2. Don't believe everything you think. 3. Biology majors should be made to suffer through physics along with the rest of us. And 4. If you make solar models out of food, don't expect to be invited to many parties.

RICHARD THOMPSON